FEDERAL SIGNAL

CONVERGENCE network

Model SSP3000 shown

SmartSiren® Platinum
Installation and Maintenance Instructions

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CHAPTER 1

Safety Messages for Installers and Operators

For your safety, read and understand this manual thoroughly before installing, operating, and servicing the SmartSiren Platinum siren amplifier/relay module. The safety messages presented in this chapter and throughout the manual are reminders to exercise extreme care at all times. In addition, read and understand the safety instructions to installers (doc. no. 256A692), and keep it close at hand for reference.

To download copies of this manual, go to www.fedsig.com or call the Federal Signal Service Department at 1-800-433-9132, 7 a.m. to 5 p.m., Monday through Friday (CT).

Safety Messages to Installers of Sound/Light Systems

⚠ WARNING

People's lives depend on your proper installation and servicing of Federal Signal products. It is important to read and follow all instructions shipped with this product. In addition, listed below are some other important safety instructions and precautions you should follow:

Before Installation

Qualifications

- To properly install an electronic siren, you must have a good understanding of automotive electrical procedures and systems, along with proficiency in the installation and service of safety warning equipment. Always refer to the vehicle's service manuals when performing equipment installations on a vehicle.

Sound Hazards

- Your hearing and the hearing of others, in or close to your emergency vehicle, could be damaged by loud sounds. This can occur from short exposures to very loud sounds, or from longer exposures to moderately loud sounds. For hearing conservation guidance, refer to federal, state, or local recommendations. OSHA Standard 1910.95 offers guidance on "Permissible Noise Exposure."

- All effective sirens and horns produce loud sounds (120 dB) that may cause permanent hearing loss. Always minimize your exposure to siren sound and wear hearing protection. Do not sound the siren indoors or in enclosed areas where you and others will be exposed to the sound.

- Federal Signal siren amplifier/relay modules and speakers are designed to work together as a system. Combining a siren and speaker from different manufacturers may reduce the warning effectiveness of the siren system and may damage the components. You should verify or test your combination to make sure the system works together properly and meets federal, state and local standards or guidelines.

During Installation

- Do NOT get metal shavings inside the product. Metal shavings in the product can cause the system to fail. If drilling must be done near the unit, place an ESD approved cover over the unit to prevent metal shavings from entering the unit. Inspect the unit after mounting to be sure there are no shavings present in or near the unit.
- Do NOT connect this system to the vehicle battery until ALL other electrical connections are made, mounting of all components is complete, and you have verified that no shorts exist. If wiring is shorted to vehicle frame, high current conductors can cause hazardous sparks resulting in electrical fires or flying molten metal.
- Be sure the siren amplifier/relay module and speaker(s) in your installation have compatible wattage ratings.
- In order for the electronic siren to function properly, the ground connection must be made to the NEGATIVE battery terminal.
- Sound output will be severely reduced if any objects are in front of the speaker. If maximum sound output is required for your application, you should ensure that the front of the speaker is clear of any obstructions.
- Install the speaker(s) as far forward on the vehicle as possible, in a location which provides maximum signaling effectiveness and minimizes the sound reaching the vehicle's occupants. Refer to the National Institute of Justice guide 500-00 for further information.
- Mounting the speakers behind the grille will reduce the sound output and warning effectiveness of the siren system. Before mounting speakers behind the grille, make sure the vehicle operators are trained and understand that this type of installation is less effective for warning others.
- Sound propagation and warning effectiveness will be severely reduced if the speaker is not facing forward. Carefully follow the installation instructions and always install the speaker with the projector facing forward.
- Do NOT install the speaker(s) or route the speaker wires where they may interfere with the operation of airbag sensors.
- Installation of two speakers requires wiring speakers in phase.
- Never attempt to install aftermarket equipment, which connects to the vehicle wiring, without reviewing a vehicle wiring diagram available from the vehicle manufacturer. Insure that your installation will not affect vehicle operation and safety functions or circuits. Always check vehicle for proper operation after installation.
- Do NOT install equipment or route wiring or cord in the deployment path of an airbag.
- If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment.
- Locate the control pad so the vehicle, controls, and microphone can be operated safely.
- When drilling into a vehicle structure, be sure that both sides of the surface are clear of anything that could be damaged.

After Installation

- After installation, test the siren and light system to ensure that it is operating properly.
- Test all vehicle functions, including horn operation, vehicle safety functions and vehicle light systems, to ensure proper operation. Ensure that installation has not affected vehicle operation or changed any vehicle safety function or circuit.
- After testing is complete, provide a copy of these instructions to the instructional staff and all operating personnel.
- File these instructions in a safe place and refer to them when maintaining or reinstalling the product.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

RETAIN AND REFER TO THESE MESSAGES

Safety Messages to Operators of Sound/Light Systems

⚠ WARNING

People's lives depend on your safe operation of Federal Signal products. It is important to read and follow all instructions shipped with the products. In addition, listed below are some other important safety instructions and precautions you should follow:

- Do not attempt to activate or de-activate the light system control while driving in a hazardous situation.
- Although your warning system is operating properly, it may not be completely effective. People may not see or heed your warning signal. You must recognize this fact and continue driving cautiously.
- Also, situations may occur which obstruct your warning signal when natural and man-made objects are between your vehicle and others, such as raising your hood or trunk lid. If these situations occur, be especially careful.
- All effective sirens and horns produce loud sounds that may cause, in certain situations, permanent hearing loss. You and your passengers should consider taking appropriate safety precautions, such as wearing hearing protection.
- In order to be an effective warning device, this product produces bright light that can be hazardous to your eyesight when viewed at a close range. Do not stare directly into this lighting product at a close range or permanent damage to your eyesight may occur.
- It is important that you fully understand how to safely operate this warning system before use.
- You should only operate your vehicle and its light/sound system in accordance with your department's Standard Operating Procedures.
- If a selected function does not perform properly or if any of the lamps remain illuminated when the control is off, disconnect the power connector from the control unit and contact the nearest service center.

- At the start of your shift, you should ensure that the entire warning light system and the siren system is securely attached and operating properly.
- Suction cup mounting is for temporary applications only. The unit should be removed from the window and stored securely when not in use. Temperature changes and sunlight can cause suction cups to lose holding power. Periodically check the unit to be sure the suction cups have a firm grip on the mounting surface. An improperly secured light could fall off of the vehicle causing injury and damage.
- The holding power of magnetic mounting systems is dependent upon surface finish, surface flatness, and thickness of the steel mounting surface. Therefore, to promote proper magnetic mounting:
    - ✔ The mounting surface and magnets must be kept clean, dry, and free of foreign particles that prevent good surface contact.
    - ✔ Ensure that the mounting surface is flat.
    - ✔ A magnet mounting system should not be used on vehicles with vinyl tops.
    - ✔ To prevent the light assembly from sliding on mounting surface, avoid quick acceleration and hard stops.

Failure to follow these precautions may result in property damage, serious injury, or death.

RETAIN AND REFER TO THIS MESSAGE

CHAPTER 2

An Overview of the SmartSiren Platinum

The SmartSiren Platinum siren amplifier/relay module is a full-featured, programmable electronic siren and light control system. State-of-the-art microprocessor technology is used to create a system with a small, compact control pad and a siren amplifier/relay module that can be installed in the trunk, under the dashboard, or under the seat of any vehicle with a 12 V negative ground system.

The module provides the automatic, simultaneous light and siren activation required by some jurisdictions. A security shotgun timer is also provided to minimize the possibility of unauthorized shotgun release. The module has six easily accessible Convergence™ Network serial ports that connect the control pad and any serially-controlled Federal Signal product. A variety of system features can be programmed with the Convergence Network Configuration Software from a computer via a crossover Ethernet cable that connects the control pad. System features include flash patterns, siren tones, and momentary, push-on/push-off, or timed relay operation. Programming does not require disassembling or removing any hardware from the vehicle.

Siren, PA, and Speakers

The Smart Siren produces wail, yelp, priority, and hi-lo siren tones, as well as an air horn sound. The horn-ring transfer feature enables the driver to control siren tones by pressing the horn button. Public address is available with the Federal Signal microphone, which is included with the system. Radio rebroadcast is also available. The Model SSP3000 module can drive one or two 11-ohm impedance, 100 W speakers, and the Model SSP2000 module can drive one. Two speakers must always be connected in parallel and in phase.

Lightbars and SignalMaster™ Control

Compatible lightbars include full featured, serially-controlled Federal Signal Arjent® S2, Legend®, and Raydian® S2 as well as the ILS Series of interior-mounted lightbars. A full featured SignalMaster controller is integrated into the system. In addition, flash rates and patterns, lightbar dimming, and other options can be programmed with the Convergence Network Configuration Software.

Programmable Solid-State Auxiliary Relays

The Model SSP3000 has 14 solid-state relays: ten 10-ampere Hi-Lo and four 3-ampere Hi. The Model SSP2000 has 11 solid-state relays: one 10-ampere Hi-Lo, six 10-ampere Hi, and four 2-ampere Hi.

Programmable Input Circuits

Both models of the siren amplifier/relay modules have connections for four relay input circuits. Relay inputs 1 and 2 are active-low inputs that activate a switch when pulled to ground. Relay inputs 3 and 4 are active-high inputs that activate a switch when pulled to 12 Vdc battery voltage. The inputs are most commonly used for switches that send a signal to the siren amplifier/relay module when a condition in the vehicle changes. Changes may include the opening of a trunk or door, a rise in vehicle temperature, or the release of a gun lock.

The control pad has connections for four active-low inputs that activate when pulled to ground. Similar to the relay circuits, they can be configured to operate with the Convergence system control pad or with the configurable switches on the steering wheel of the Ford Police Interceptor.

LED Indicators and Visual Diagnostics (Model SSP3000 Only)

LEDs visible just below the surface of the siren amplifier/relay module indicate when power is supplied to the auxiliary outputs and if the module is transmitting and receiving data. LEDs also indicate when a signal is received by the four input circuits and if the lightbar is functioning. Externally mounted mini-blade fuses for the siren, horn-ring circuit, SignalMaster, and auxiliary relays have LEDs that glow when the fuse fails, making them easy to spot.

All buttons on the control pad glow when the system is on. Pressed buttons turn bright to indicate that the function they control is active. LEDs under the SmartSiren logo mimic these active SignalMaster patterns: Left, Right, Center-Out, or Warn patterns 1 to 4. LEDs glow over the position in which the slide switch is placed.

System Specifications

Input Voltage	11 Vdc to 16 Vdc
Polarity	Negative ground only
Operating Temperature Range	–40 °C to +65 °C (relays at full power) –40 °C to +80 °C (relays at 60 percent power)
Standby Current	Less than 0.5 A
Dimensions:	
Amplifier/relay module	
Height	4.22 in (10.72 cm)
Width	7.94 in (20.17 cm)
Length	6.81 in (17.30 cm)
Net Weight	5.40 lb (2.45 kg)
Control pad	
Height	3.26 in (8.28 cm)
Width	1.62 in (4.11 cm)
Length	6.80 in (17.27 cm)
Net Weight	0.8 lb (0.36 kg)
Shipping Weight	10.0 lb (4.53 kg)

Siren Specifications

Speakers	SSP2000: one 100 W, 11-ohm speaker SSP3000: one or two 100 W, 11-ohm speakers
Operating Current (no lamps on)	9 A (nominal) (13.6 V battery, 11-ohm load at high power)
Frequency Range	725 to 1600 Hz
Nominal Cycle Rate	Wail: 12 cycles per minute Yelp: 180 cycles per minute Priority: 370 cycles per minute Hi-Lo: 60 cycles per minute
Nominal Voltage Output	64 V peak-to-peak (siren tones)
Audio Response	300 Hz to 3000 Hz ± 3 dB
Audio Power	45 W in PA Mode (typical with 1.4 V peak-to-peak input)
Harmonic Distortion	Less than 10 percent from 5 to 45 W
Input Impedance (PA)	4000 ohms (nominal)
Siren Tone Compliances	SAE J1849 JUL89

SignalMaster Specifications (Model SSP3000 only)

Fuse	20 A (halogen or LED)
Output Drive Capability (Total)	Eight lamps at 27 W each
Normal Flash Rate	
Directional and Warn	Approximately 35 patterns per minute
Fast Flash Rate	
Directional and Warn	Approximately 45 patterns per minute

Relay Specifications

Model SSP3000 Fuse Capability	AUX 1 to 10: 10 A (Hi-Lo) AUX 11 to 14: 3 A (Hi)
Model SSP2000 Fuse Capability	AUX 1 to 6: 10 A: (Hi-Lo) AUX 10: 10 A (Hi) AUX 11 to 14: 2 A (Hi)
Flash Rates	75 flashes per minute 90 flashes per minute 120 flashes per minute 200 flashes per minute 300 flashes per minute

SmartSiren Platinum Kit Contents

Table 2.1 (Model SSP3000) and 2.3 (SSP2000) lists the parts included with the SmartSiren Platinum kit. After unpacking the kit, examine it for damage that may have occurred in transit. If the product has been damaged, file a claim immediately with the carrier stating the extent of damage. Carefully check all envelopes, shipping labels, and tags before removing or destroying them. Ensure all parts in the packing list are included in the shipment. If any parts are missing, call Federal Signal Customer Support at 1-800-264-3578, 7 a.m. to 5 p.m., Monday through Friday, Central Time.

Table 2.1 SSP3000 kit contents

Qty.	Description	Part Number
1	SSP3000 Control Pad	85361208
1	SSP3000 Siren Amplifier/Relay Module	85361211
1	Cable Assy., RS485, 25 ft	1751357-02
1	Cable Assy., RS485, 8 in	1751357-06
1	Cable Assy., Control	1751530
1	Cable Assy., RJ45, Ethernet Crossover	1751532
1	Cable Assy., Auxiliary Relay	1751541
1	Cable Assy., SignalMaster and Inputs	1751542
1	Cable Assy.	17500063
2	Bracket, Mounting, Control Pad	85361065
2	Screw, Mach. Pan Head, #6-32	7000A404-05
2	Screw, Cap, Hex Head, 1/4"-20	7002A000-12
2	Screw, Pan Head, #10, Thread-Forming	7011A047-08
2	Lock Washer, Split, #6	7074A001
2	Lock Washer, Ext, Tooth, 1/4"	7075A007
1	Keypad Legends, Scored Sheet	181460
1	Microphone with Modular Plug	256B577-03
4	Fuse, 3 A, Mini Blade, LED Indicator	148210-02
1	Fuse, 5 A, Mini Blade, LED Indicator	148210-04
10	Fuse, 10 A, Mini Blade, LED Indicator	148210-06
2	Fuse, 20 A, Mini Blade, LED Indicator	148210-08
1	Quick Connect Guide	2562417
1	Quick Reference Guide	2562503
1	Card, Safety Instructions	256B691
1	Instruction Sheet, Operators Safety Messages	256A692
1	Label, Warning, Siren/Speaker	1612339

Table 2.2 SSP2000 kit contents

Qty.	Description	Part Number
1	SSP2000 Control Pad	85361208-SSP2K
1	SSP2000 Siren Amplifier/Relay Module	85361211-SSP2K
1	Cable Assy., RS485, 25 ft	1751357-02
1	Cable Assy., RS485, 8 in	1751357-06
1	Cable Assy., Control	1751530
1	Cable Assy., RJ45, Ethernet Crossover	1751532
1	Cable Assy., Auxiliary Relay	1751541
1	Cable Assy., SignalMaster and Inputs	1751542-NY
1	Cable Assy.	17500063
2	Bracket, Mounting, Control Pad	85361065
2	Screw, Mach. Pan Head, #6-32	7000A404-05
2	Screw, Cap, Hex Head, 1/4"-20	7002A000-12
2	Screw, Pan Head, #10, Thread-Forming	7011A047-08
2	Lock Washer, Split, #6	7074A001
2	Lock Washer, Ext, Tooth, 1/4"	7075A007
1	Keypad Legends, Scored Sheet	181460
1	Microphone with Modular Plug	256B577-03
4	Fuse, 2 A, Mini Blade	148181-09
1	Fuse, 5 A, Mini Blade	148181-03
7	Fuse, 10 A, Mini Blade	148181-05
1	Fuse, 20 A, Mini Blade	148181
1	Quick Reference Guide	2562503
1	Card, Safety Instructions	256B691
1	Instruction Sheet, Operators Safety Messages	256A692
1	Label, Warning, Siren/Speaker	1612339

CHAPTER 3

Wiring the SmarSiren Platinum

Before permanently installing the SmartSiren Platinum system, plan all wire routings and select the mounting locations for the siren amplifier/relay module and control pad. Also read and understand all instructions included with related equipment before installing it.

Selecting Mounting Locations

When fastened to the back of the control pad, the mounting bracket covers the wiring connectors and a supplemental control for the gain or volume of the radio rebroadcast feature. To facilitate the installation of the SmartSiren Platinum system, select mounting locations for the control pad and the siren amplifier/relay module before permanently mounting them in the vehicle. After completing the wiring described in this chapter, refer to the instructions for mounting the control pad and the siren amplifier/relay module in Chapter 5 on page 38.

⚠ WARNING	***AIRBAG DEPLOYMENT—Do not install equipment or route wiring in the deployment path of an airbag. Failure to observe this warning will reduce the effectiveness of the airbag or potentially dislodge the equipment, causing serious injury or death.***

⚠ WARNING	***SEAT REMOVAL PRECAUTION—If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment.***

NOTICE	***UNIT REQUIRES AIR FLOW (SSP3000 ONLY)—The siren amplifier/relay module is cooled by an internal fan. Do not install it in areas where the air flow is restricted. Do not mount the unit near a heater duct or under the hood.***

NOTICE	***UNIT IS NOT WATERPROOF—The housing of the siren amplifier/relay module is NOT waterproof. The module must be mounted in a location that is sheltered from falling rain, snow, standing water, etc.***

For the control pad, select a mounting location that allows the vehicle, controls, and microphone to be operated safely under all driving conditions. To identify safe mounting areas for equipment inside the vehicle, consult the vehicle manufacturer's guidelines. To avoid driver distraction and unreliable switch activation, the mounting location must not allow any movement of the control pad. Do not select a padded surface for the mounting location of the control pad. For the siren amplifier/relay module, suggested mounting locations are under the dash, under the front seat, or in the trunk under the rear deck near the rear-seat speakers. Wiring connectors are located on the back of the siren amplifier/relay module. Terminals for the ground and power connections are located on each side toward the rear. **To maintain the reliability of the Model SSP3000 amplifier/relay module, which is cooled by a fan, ensure that there is enough room for the flow of air.**

Figure 3.1 Dimensions of the control pad

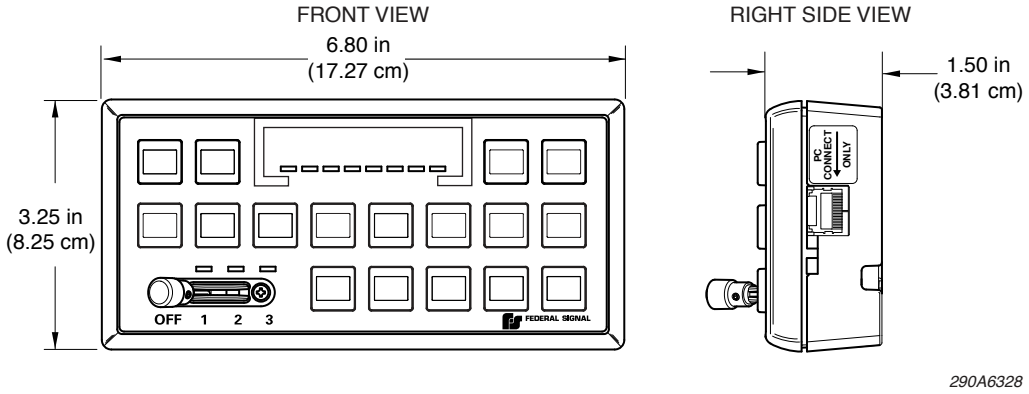
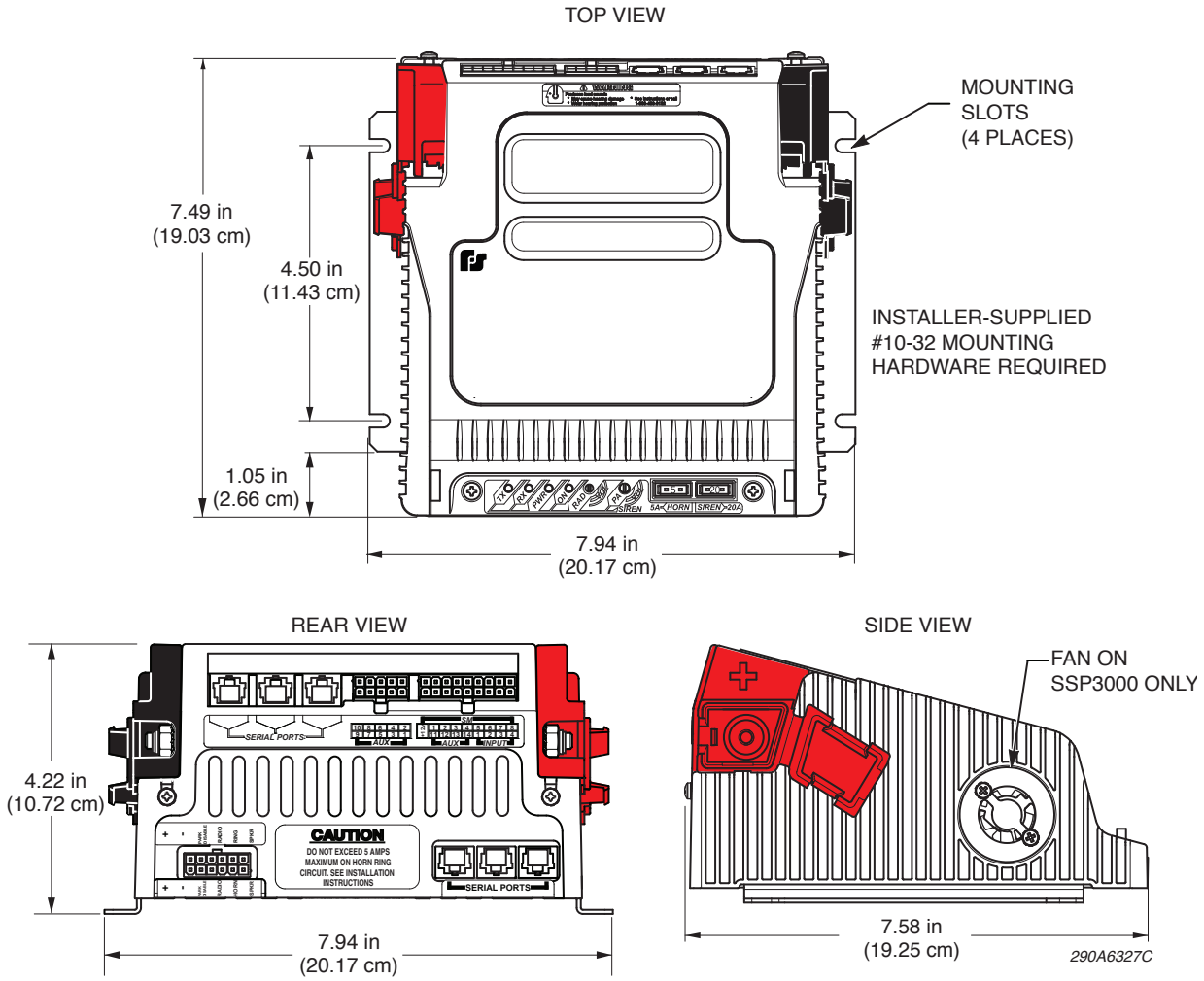


Figure 3.2 Dimensions of the siren amplifier/relay module



Convergence Network Connections

The Convergence Network system has these types of connections via cables and locking connectors included with the kit:

Connections for the siren amplifier/relay module:

- Six "plug and play" serial ports that communicate on the Federal Signal Convergence network with the control head, compatible lightbars, and the Federal Signal Model 660100 Relay Module/Two-Channel Flasher.
- Eight to ten 10 A auxiliary solid-state relays (cable assembly P/N 1751541)
- Four low-current auxiliary solid-state relays (cable assembly P/N 1751542 and P/N 1751542-NY)
- SignalMaster directional warning lights (cable assembly P/N 1751542) SSP3000 only
- Four auxiliary relay inputs (cable assembly P/N 1751542)
- Speakers, radio rebroadcast, a park disable circuit, and a horn ring circuit (cable assembly P/N 1751530)
- Power terminals for negative ground and positive 12 Vdc

Connections for the control pad:

- Four active-low input circuits that activate when pulled to ground. They can be configured to operate with the SSP3000 system control pad or with the switches on the steering wheel of the Ford Police Interceptor.
- Connections to the siren for battery ground (–GND) and +12 Vdc switched by ignition
- Connection for the Federal Signal public address microphone (P/N 258B577-03)
- Convergence Network 25-foot cable that connect the control pad to the siren amplifier (P/N 1751532)

For instructions on configuring the operation of the devices connected through the Convergence Network, see the "Converrgence Configuration Software Manual" P/N 2562418.

⚠ WARNING ***HIGH CURRENT ARCING—Do not connect this system to the vehicle battery until ALL other electrical connections are made and you have verified that no shorts exist. High current conductors can cause hazardous sparks or burning wire resulting in electrical fires.***

NOTICE ***DRILLING PRECAUTIONS—When drilling holes, check the area into which you are drilling to be sure that you do not damage vehicle components while drilling. All drilled holes should be deburred and all sharp edges should be smoothed. All wiring routings going through drilled holes should be protected by a grommet or convolute/split loom tubing.***

To prepare the vehicle for the electrical installation of the Convergence Network system:

1. After planning where to route the wires and cables for the system components—such as Federal Signal warning lights, directional lights, and speakers—drill the holes for the wiring. Smooth, deburr, and insert a grommet in the holes.

2. Mount the system components according to the instructions included with each product.

The next sections describe how to connect and wire each system component to the siren amplifier/relay module.

Convergence Network Connections

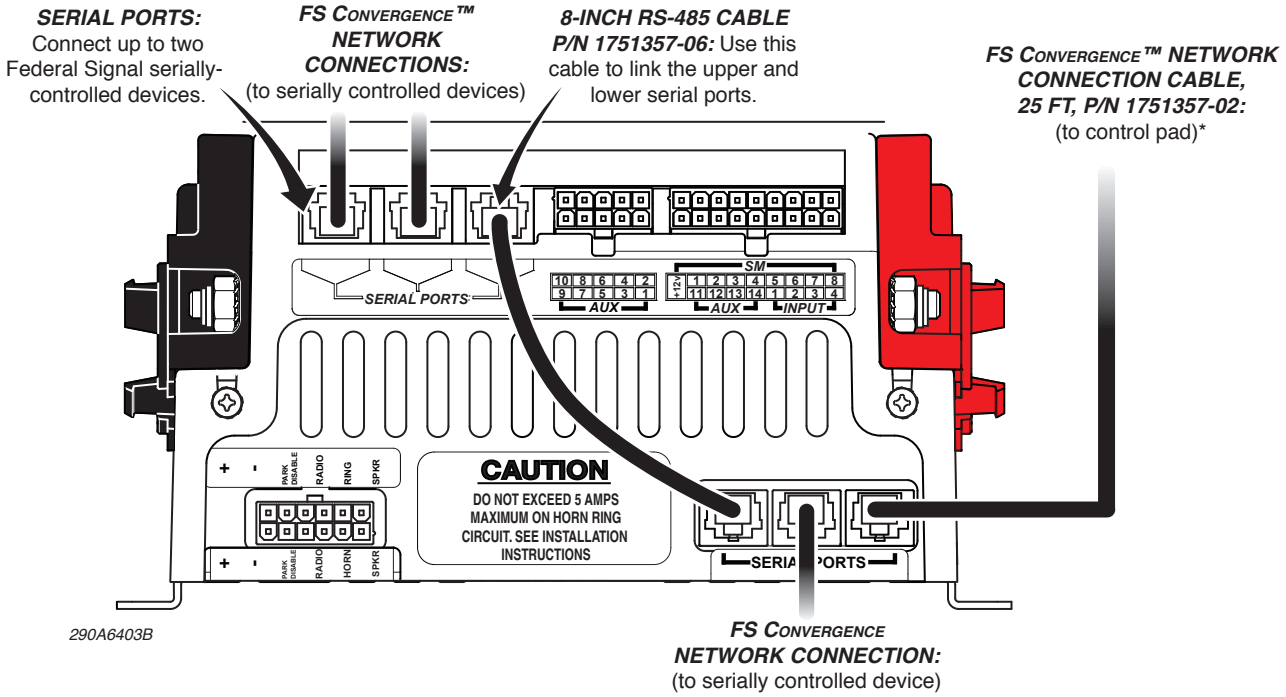
There are three network ports on the upper left rear corner and three network ports on the lower right rear corner of the siren amplifier/relay module. These ports connect Federal Signal network devices through RS-485 communication cables.

Network devices include:

- The system control pad, which must be connected to a lower serial port on the siren amplifier/relay module. Use the 25-foot FS Convergence Network cable (P/N 1751357-02) to connect the control pad to the module.
- Exterior-mounted, full-size lightbars, such as the Arjent® S2, Legend®, and Raydian® S2. Configurable options include flash patterns and functions, such as dimming, takedowns, and alley lights.
- ILS System lightbars that include three models of single-level LED lightbars—Front ILS, Rear Lower ILS, and Rear Upper ILS—that mount on the inside of a vehicle windshield. Configurable options include flash patterns and functions, such as dimming, takedowns, and alley lights.

Figure 3.3 shows the network connections on the back of the siren amplifier/relay module. For mounting instructions for the network devices, refer to the instructions included with the products.

Figure 3.3 Serial port locations



To connect the devices:

1. Carefully route the cables from the network devices through the vehicle to the connectors on the siren amplifier/relay module.
2. To provide strain relief, secure the cables with installer-supplied clamps and hold-downs.
3. Insert the modular connector at the end of each cable into the appropriate connector.

   Note: To link the devices connected to the upper and lower serial ports on the module, use the 8-inch RS-485 cable (P/N 1751357-06) provided with the Convergence Network system (Figure 3.3). The 25-foot FS Convergence Network cable must be connected between the control pad and one of the three lower serial ports.

Connections for 10 A Auxiliary Relays

Cable assembly P/N 1751541 has 18-inch leads for eight to ten (depending on the model) 10 A solid state relays with these configurable options:

- +12 Vdc out (active high) or negative (–) ground out (active low).
- Steady-on or one of five flash rates for small flashing lights.
- Synchronized or alternating flashing for two or more lights.
- Open off or inverse off operation.

Note: The Model SSP2000 has one hi-lo 10 A relay. The rest are +12 Vdc only,

Table 3.1 Configurable activation options for 10 A solid-state relays

Configured Activation	Description
Active High	The relay supplies +12 Vdc during the “on” state.
Active Low	The relay supplies ground during the “on” state.
Open Off	The relay is open during the “off” state, a condition similar to an open electromechanical relay.
Inverse Off	The NC relay alternates from its former polarity to the other each time it is in the “off” state.

Figure 3.4 Configurable activation options for 10 A solid-state relays with active-low capability

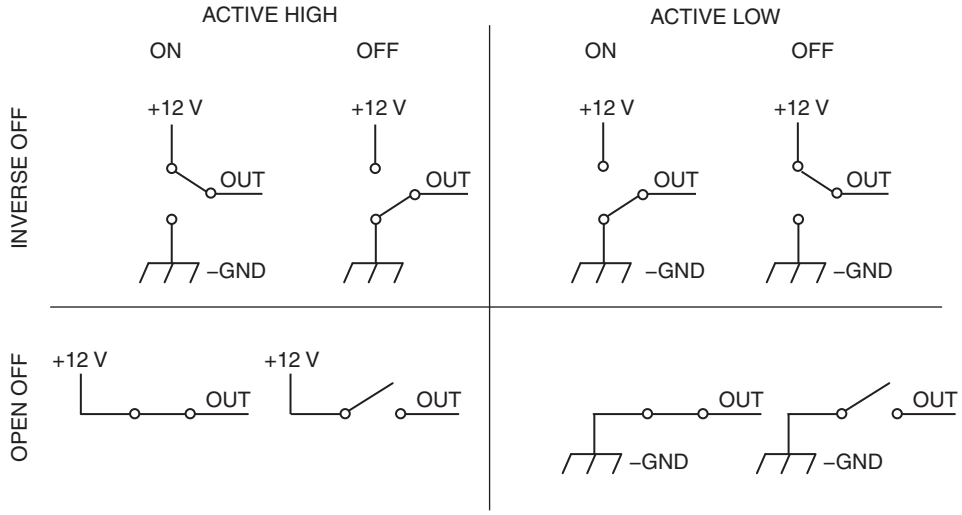
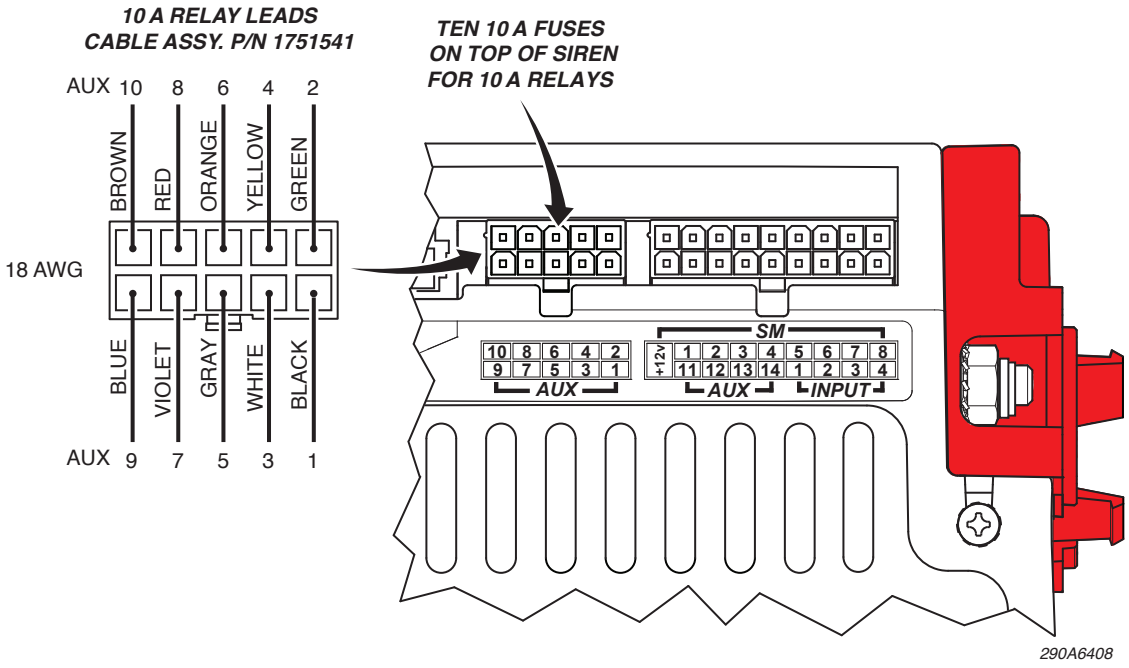


Figure 3.5 shows the connectors for the 10 A relay cable assembly on the back of the amplifier/relay module. The relays are fused on top of the module with 10 A mini-blade fuses. Extend wiring with 18 AWG leads or thicker. Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads.

Figure 3.5 Connection for 10 A solid-state relays



Connections for Low Current Auxiliary Relays

Cable assembly P/N 1751542 (SSP3000) and P/N 1751542-NY (SSP2000) and includes 18-inch, 18 AWG leads for four solid-state relays. The relays are 12 Vdc out only (active high) with these software-configurable options:

- Steady-on lighting or one of five flash rates for small flashing lights.
- Synchronized or alternating flashing for two or more small flashing lights.

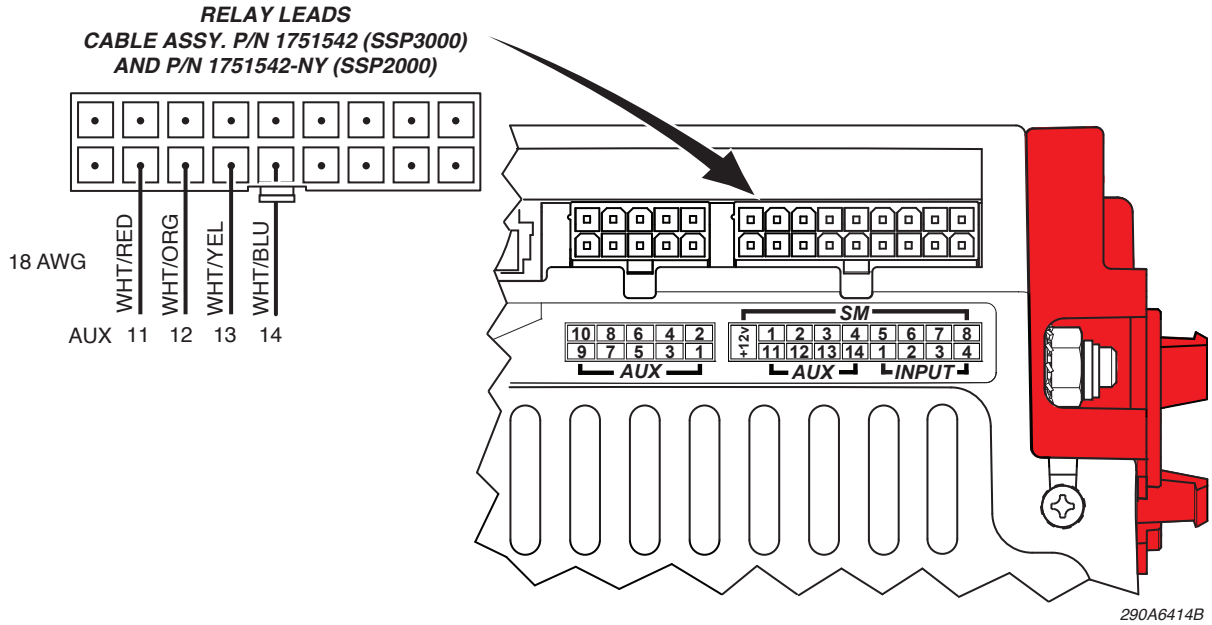
Figure 3.6 shows the connectors for the relay cable assembly on the back of the siren amplifier/relay module. The relays are fused on the top of the module with four 3 A mini-blade LED fuses for the SSP2000 and 2 A mini-blade fuses for the SSP2000.

Extend wiring with 18 AWG leads or thicker. Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads.

Table 3.2 Configurable activation options for 3 A solid-state relays

Configured Activation	Description	Diagram
Active High	The relay supplies +12 Vdc during the “on” state.	+12 V OUT
Open Off	The NC relay is open during the “off” state, a condition similar to an open electromechanical relay.	+12 V OUT

Figure 3.6 Connection for 3 A solid-state relays



Connections for Rear External Discrete SignalMaster (SSP3000 Only)

Cable assembly P/N 1751542 includes 18-inch, 20 AWG wires for six-head and eight-head SignalMaster lightbars that are wired discretely. These directional warning lights are standalone lightbars, rather than part of a full-featured, serially-control lightbar, with separate wires for each lighthead. The Convergence network accepts up to four SignalMaster lightbars of any type.

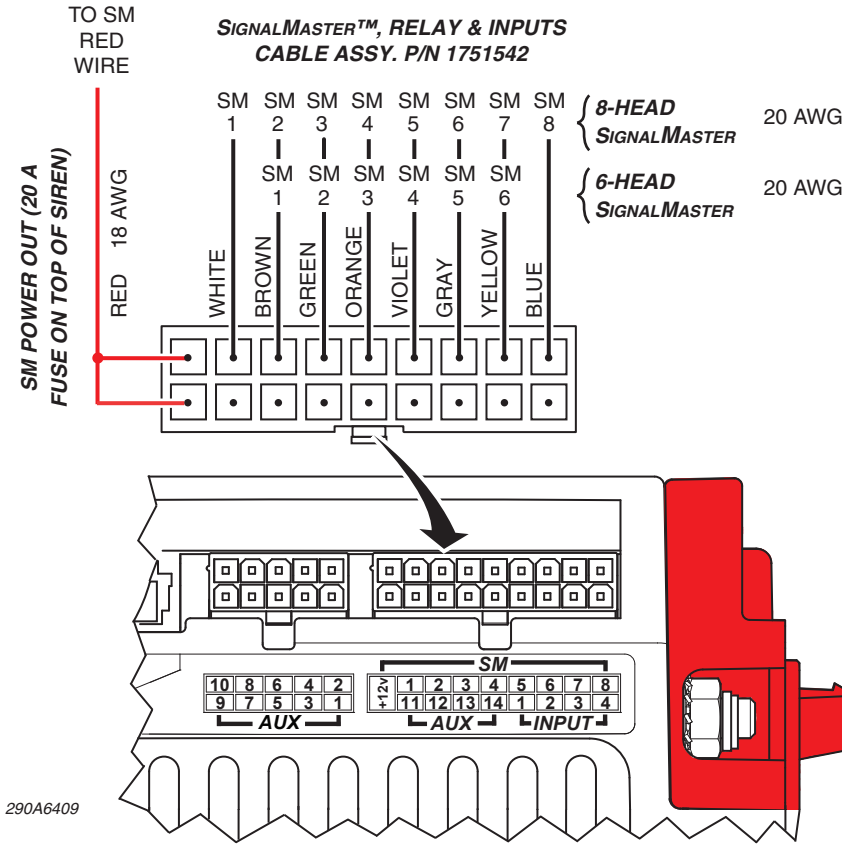
The SignalMaster has these software-configurable options:

- Step-through selection of up to four directional warn patterns
- Four SAE directional warn patterns
- Ten non-SAE warn patterns
- Fast and low-power

Figure 3.7 shows the connectors for a six and an eight-head SignalMaster on the back of the amplifier/relay module. Extend the red power wire with an 18 AWG lead or thicker. The SignalMaster is fused on the top of the siren amplifier/relay module with a 20 A mini-blade LED fuse.

Extend wiring to the SignalMaster lightheads with 20 AWG leads or thicker. Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads.

Figure 3.7 Connections for discretely wired SignalMaster

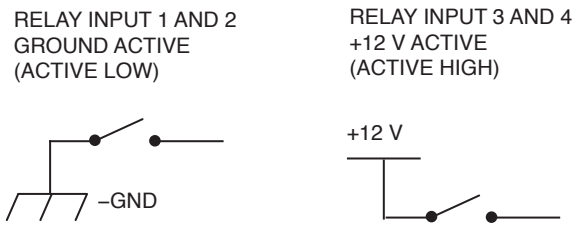


Connections for Relay Inputs 1 to 4

Cable assembly P/N 1751542 and P/N 1751542-NY includes 18-inch, 20 AWG wires for four relay circuit inputs. Figure 3.9 shows the connectors for the four input leads on the back of the amplifier/ relay module. **Inputs 1** to **4** are most commonly used for circuits that send a signal to the SSP3000 system when a condition in the vehicle changes. Changes in conditions may include the opening of a trunk or door, a rise in vehicle temperature, or the release of a gun lock. The inputs are often used for police vehicle anti-theft devices, intrusion alarms, and temperature monitoring systems for K9 vehicles.

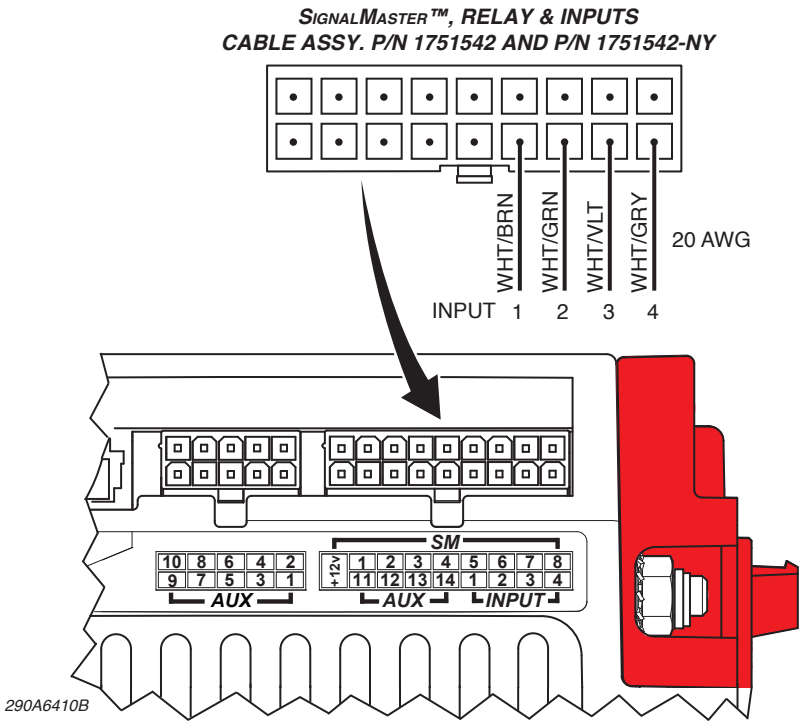
Input 1 and **2** are active-low inputs that activate when the input pin is pulled to ground. **Input 3** and **4** are active high inputs that activate when the input pin is pulled to +12 Vdc battery voltage (Figure 3.8).

Figure 3.8 Switch operation for Inputs 1 to 4



Software-configurable options include siren activation or siren mute, timer settings, and switch operation. Extend wiring with 20 AWG leads or thicker. Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads.

Figure 3.9 Connections for the four input circuits



Speaker Connections (Cable Assembly P/N 1751530)

The SSP2000 siren amplifier operates with one two 11-ohm-impedance, 100-watt speaker, while the SSP3000 sis designed to operate with one or two 11-ohm-impedance, 100-watt speakers. Software-configurable options include a variety of siren tones, horn ring transfer, slide switch operation, and siren activation or siren mute.

NOTICE ***WIRING PRECAUTION—Do not connect the brown zip cord wires to the speaker. Failure to follow this precaution may damage the speaker system.***

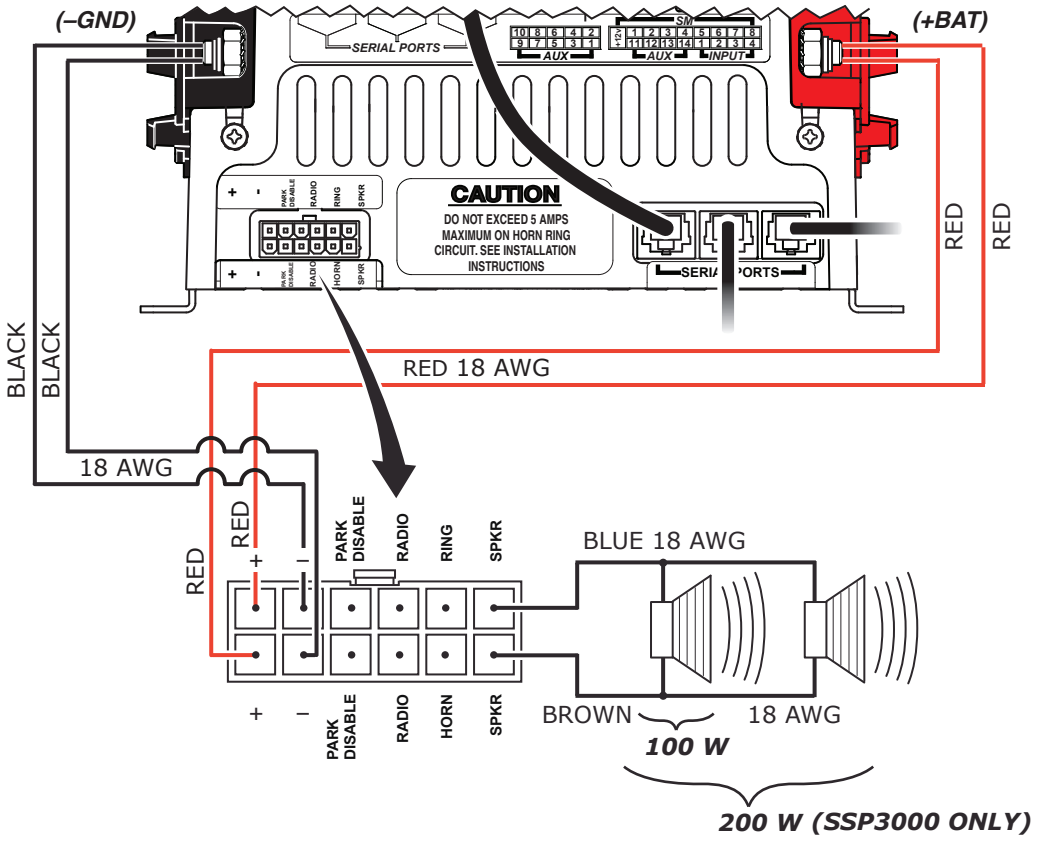
To connect one speaker:

1. Use 18 AWG wire to connect one speaker lead to the blue lead from cable assembly P/N 1751530.
2. Use 18 AWG wire to connect the other speaker lead to the single brown lead from cable assembly P/N 1751530.

To connect two speakers (SSP3000 only):

Connect the speakers in parallel and in phase to the blue lead and the single brown lead from cable assembly P/N 1751530. When finished, insulate spliced leads with twist-on wire connectors. Fold and seal unused leads.

Figure 3.10 Connections for two speakers



Horn Ring Transfer (Cable Assembly P/N 1751530)

The default setting for the slide switch transfers the horn-ring activation of the siren in **Slide Switch 2** and **3**. In **Slide Switch 2**, a press of the horn button activates the Manual tone. In **Slide Switch 3**, each press of the horn button cycles through a siren function, such as tones or air horn, assigned to horn-ring transfer via the Convergence Configuration Software. In addition, the default configuration for **Slide Switch 3** is **Siren Dependent Enabled**, which restricts siren activation to the slide switch position you select. For example, if you press a button that is assigned a siren tone, the tone only activates when you place the slide switch in the position that is **Siren Dependent Enabled**.

To enable horn-ring control of siren tones, obtain a SPST relay of enough contact-current capacity to activate the vehicle horn:

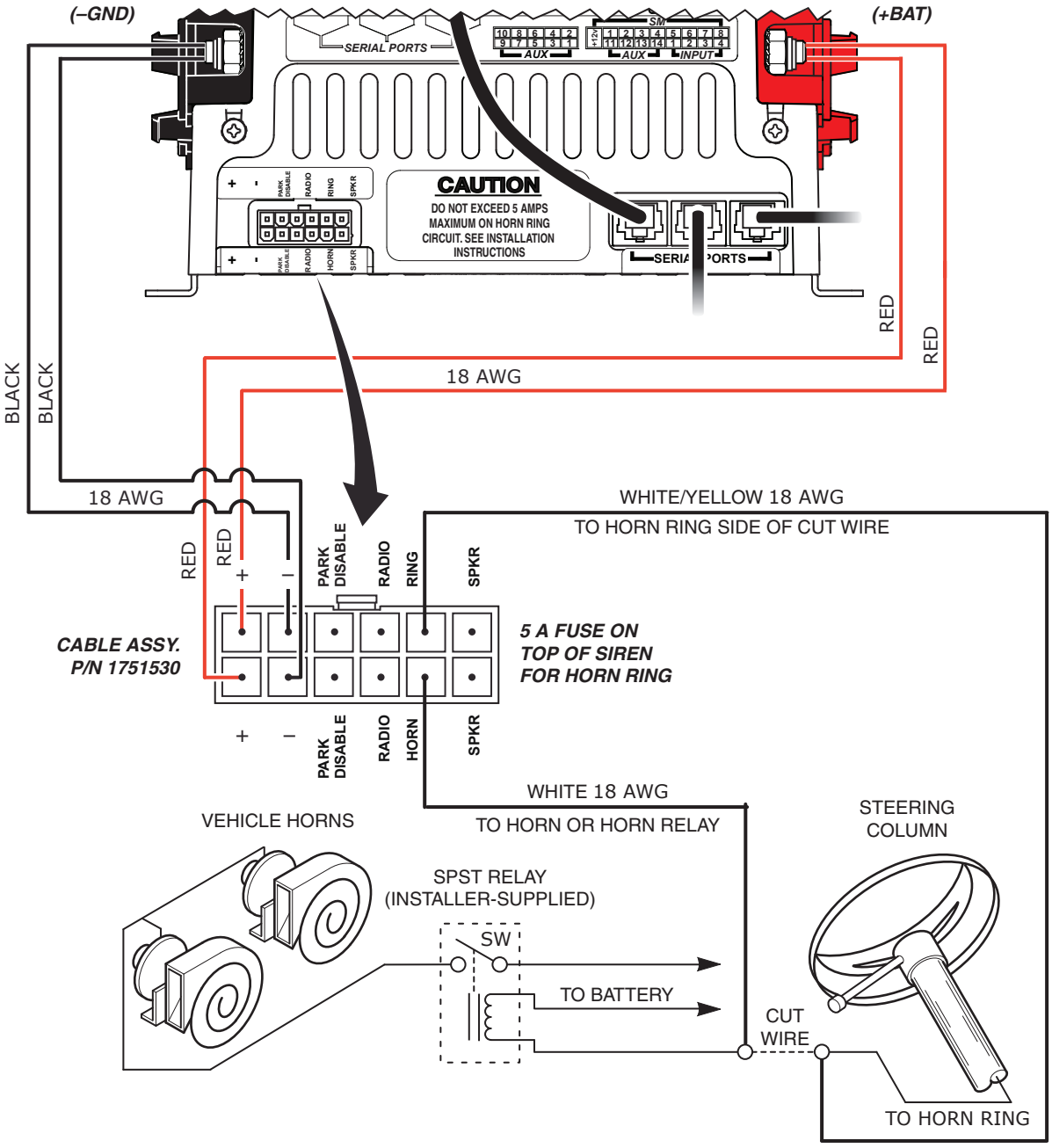
1. Cut the wire that connects the switch for the vehicle horn ring to the horn or horn relay (Figure 3.11 on page 27).
2. Splice the white/yellow wire from the power cable to the horn ring side of the wire that you cut in step 1.

NOTICE

DETERMINE CURRENT FOR HORN—The horn ring transfer circuit of the siren can switch a maximum of 5 A. Some vehicles do not have a horn relay and consequently will draw more than 5 A when the vehicle horn is activated. Consult your vehicle service manual or a qualified mechanic to determine the current required to activate the horn. If it is less than 5 A, perform step 3. If it is greater than 5 A, perform steps 4 through 9.

3. Splice the white wire from the power cable to the horn side of the cut wire.
4. Mount the SPST relay in a suitable location.
5. Connect the horn side of the wire cut in step 1 to the relay-contact terminal.
6. Determine the “sense” of the vehicle’s horn ring activation circuit. Does the horn circuit require a switched positive voltage or switched ground for activation?
7. Connect the switched relay-contact terminal to the positive or negative potential you determined in step 6.
8. Connect the white wire from the power cable to one end of the relay coil.
9. Connect the other end of the relay coil to the opposite potential of that connected to the switched relay contact terminal in step 7.
10. Insulate the spliced leads with twist-on wire connectors. Fold and seal unused leads.

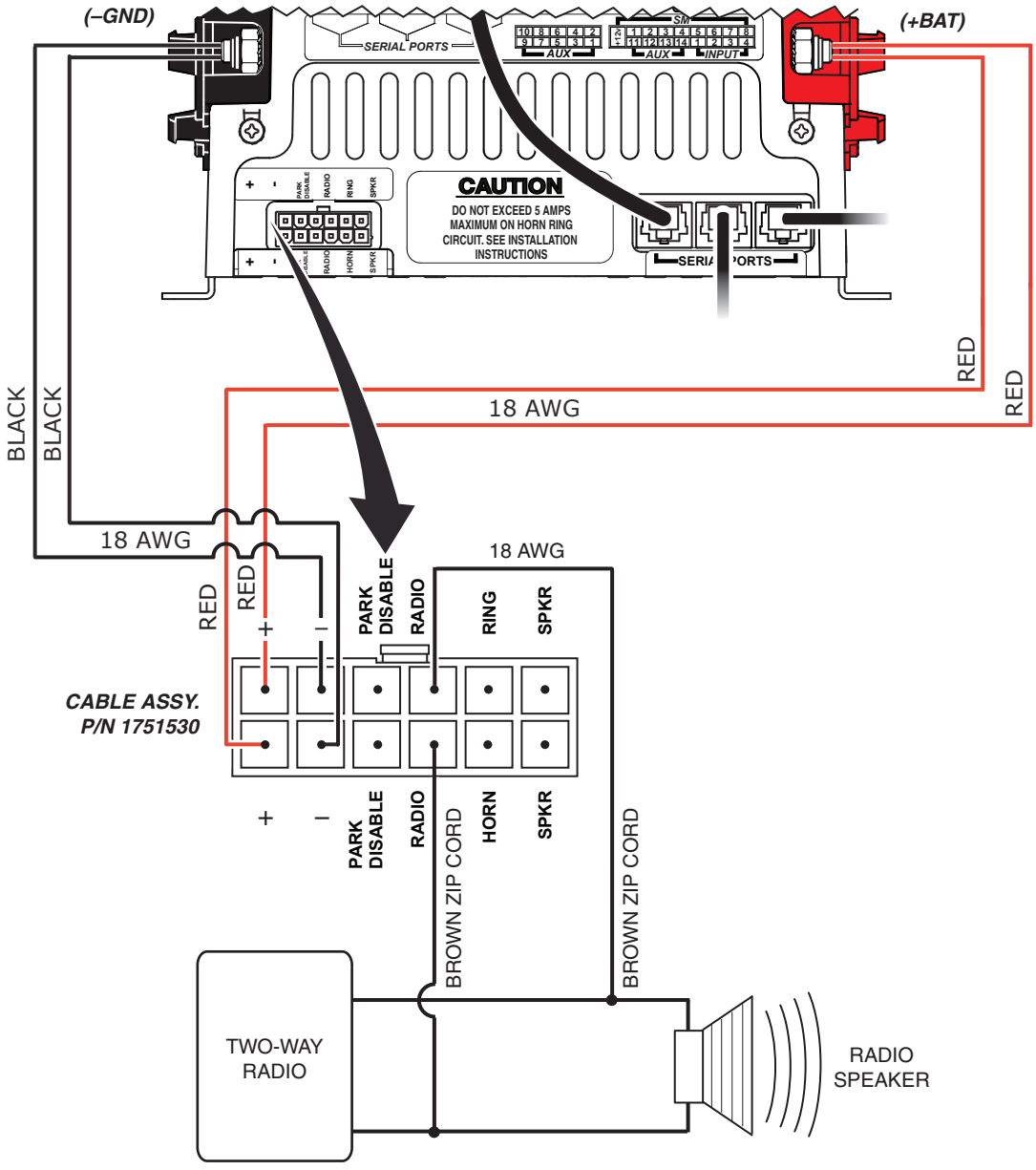
Figure 3.11 Connections for horn-ring transfer circuit



Radio Rebroadcast (Cable Assembly P/N 1751530)

To allow incoming two-way radio messages to be amplified by the siren amplifier/relay module and rebroadcast over the siren speakers, connect the brown 18 AWG two-conductor zip-cord across the speaker of the two-way radio (Figure 3.12). Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads. For instructions on adjusting the gain, see “Setting the Gain for Radio Rebroadcast” on page 35.

Figure 3.12 Connections for radio rebroadcast



Park Disable (Cable Assembly P/N 1751530)

The **Park Disable** circuit sends a signal to the siren amplifier/relay module to mute all siren functions except **Air Horn** and **Manual** when the vehicle transmission is shifted into park or neutral. The circuit can detect a +12 V signal or a –GND signal. The **Siren Mute** option is configured with the Convergence Configuration Software.

To wire the **Park Disable** option:

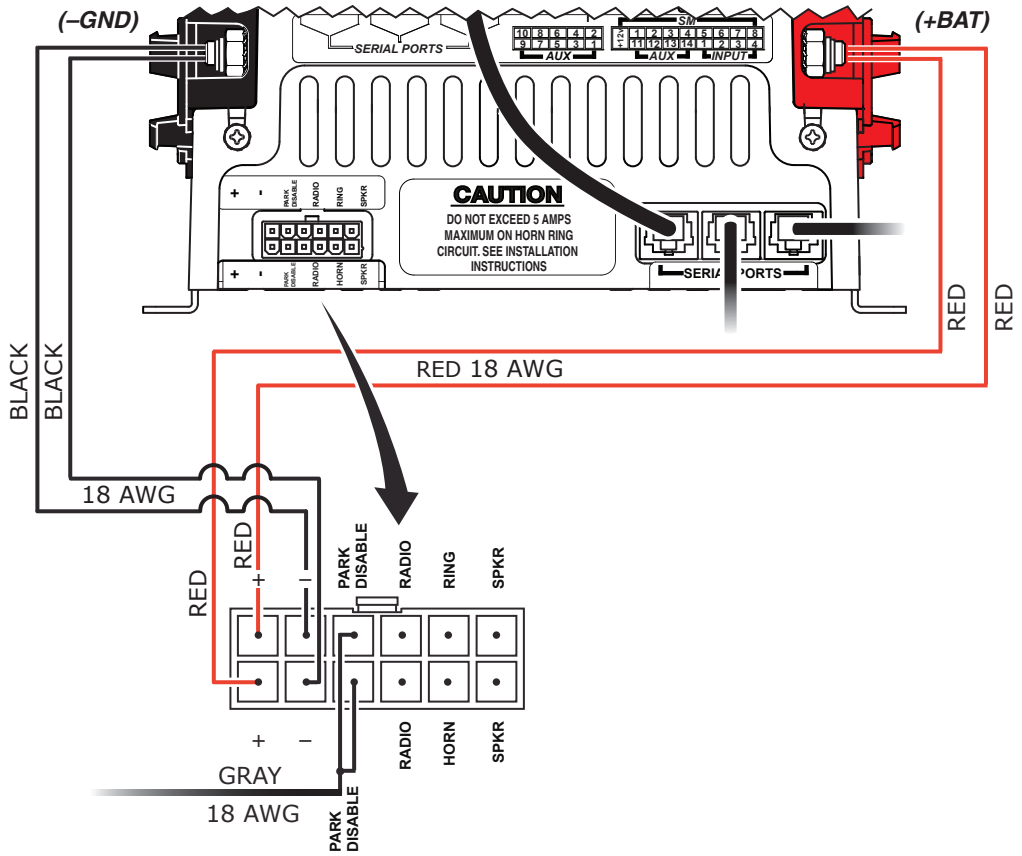
1. Connect the gray **Park Disable** wires from the siren to the electrical circuit that provides +12 V or –GND when the vehicle transmission is in park (Figure 3.13).

2. Extend wiring with 18 AWG leads or thicker.

3. Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads. Use wire ties and hold-downs for strain relief.

   NOTE: The **Park Disable** circuit must be OPEN when the vehicle is NOT in PARK. If power or ground is detected on the circuit that is CLOSED when the vehicle is not in PARK, the vehicle operator will not be able to activate any siren tones except **Air Horn** and **Manual**.

Figure 3.13 Connections for the park-detect circuit



Power Connections (Cable Assembly P/N 1751530)

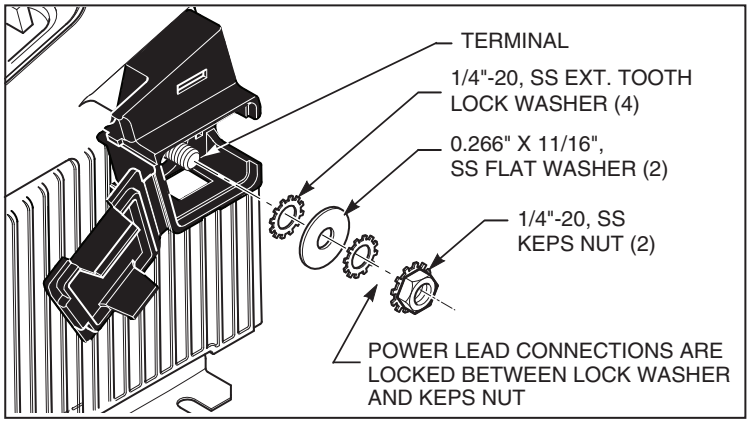
To connect power for the speakers and other devices wired to cable assembly P/N 1751530:

⚠ WARNING ***BATTERY EXPLOSION—To avoid a battery explosion, always disconnect the negative battery cable first and reconnect it last. Avoid causing a spark when connecting near or to the battery. The gases produced by a battery can cause a battery explosion that could result in vehicle damage and serious injury.***

1. Disconnect the negative (–NEG) clamp from the vehicle battery. Then disconnect the positive (+BAT) clamp from the vehicle battery.

2. Insert a flat-head screwdriver into the opening at the rear of a power terminal insulator on the amplifier/relay module. Open the insulator cover by gently angling the screwdriver outward. Repeat the process with the other insulator.

Figure 3.14 Negative power lead connections



3. Route the red lead from cable assembly P/N 1751530 to the positive (+BAT) battery terminal. Extend the wire with an 18 AWG lead or thicker. Crimp a ring terminal onto the lead and connect it to the positive battery terminal between the Keps nut and the lock washer (Figure 3.14).

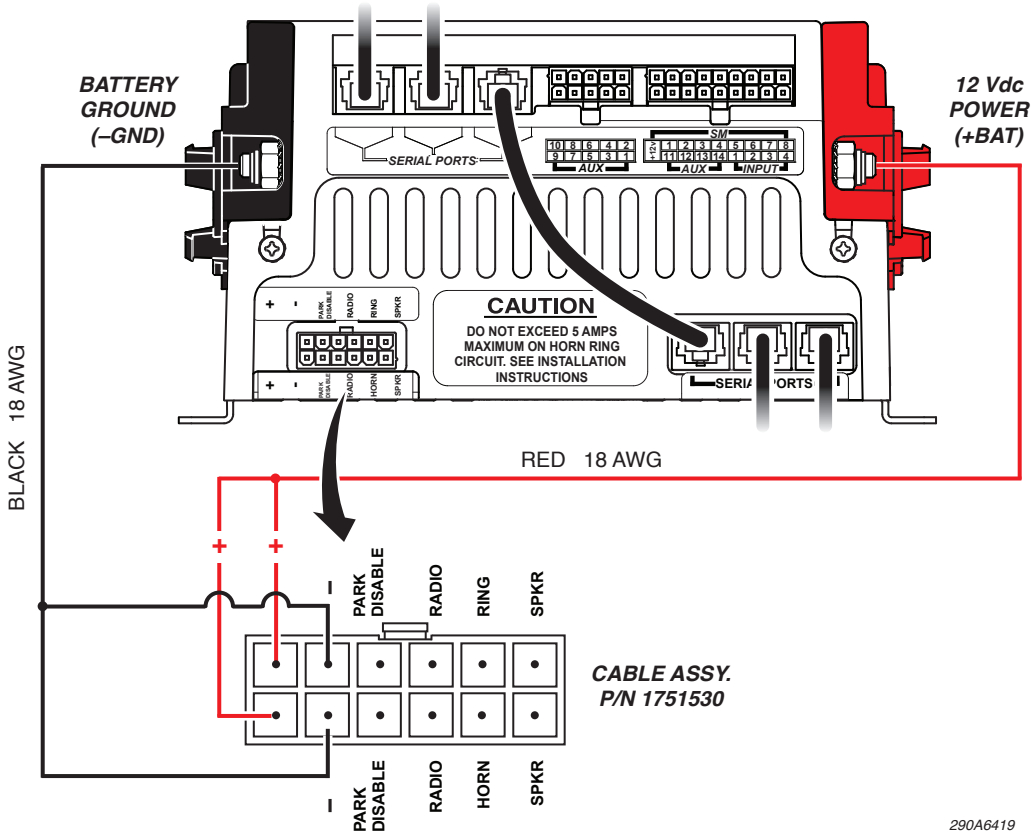
4. Route the black lead from the cable assembly to the negative (–NEG) terminal on the siren. Extend the wire with an 18 AWG lead or thicker. Crimp a ring terminal onto the lead and connect it to the negative terminal between the Keps nut and the lock washer.

5. Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads. Use wire ties and hold-downs for strain relief.

⚠ WARNING ***HIGH CURRENT ARCING—Do not connect this system to the vehicle battery until ALL other electrical connections are made and you have verified that no shorts exist. High current conductors can cause hazardous sparks or burning wire resulting in electrical fires.***

6. Leave the insulator covers open for the final power connections to the vehicle battery. Do not reconnect the battery yet.

Figure 3.15 Power connections for P/N 1751530



Connecting the Control Pad

In addition to the connection through the 25-foot Convergence Network cable shown in Figure 3.15, the control pad has:

- Connections for four active-low input circuits that activate when pulled to ground.
- Connections to the siren for battery ground (–GND) and +12 Vdc switched by ignition
- Connection for the Federal Signal public address microphone (P/N 258B577-03)
- 25-foot cable that connects the control pad to the siren amplifier (P/N 1751537-02).

The next sections describe how to connect the control pad to the network.

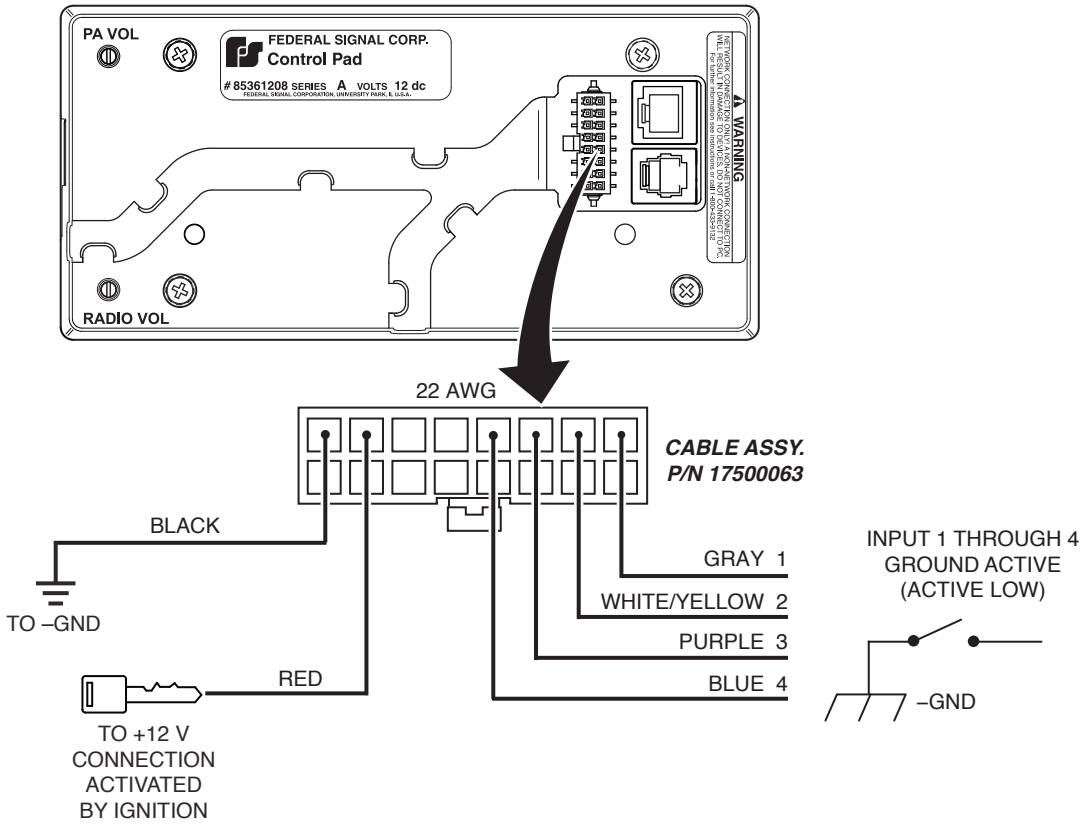
Connecting the Active-Low Input Circuits (Cable Assy. 17500063)

Cable assembly P/N 17500063 includes 18-inch, 22 AWG wires for four active-low circuit inputs. Figure 3.16 shows the connectors for the four input leads on the back of the control pad. Similar to the siren relay circuits, **Inputs 1** to **4** are most commonly used for circuits that send a signal to the Convergence Network system when a condition in the vehicle changes. Changes in conditions may include the opening of a trunk or door, a rise in vehicle temperature, or the release of a gun lock. The inputs are often used for police vehicle anti-theft devices, intrusion alarms, and temperature monitoring systems for K9 vehicles.

Each input circuit can be programmed to activate with an installer-supplied switch with a current capacity of 100 mA , the SSP3000 control pad, or with the two-way switches on the steering wheel of the Ford Police Interceptor. For the location of the vehicle 14-way connector for the ground-sourcing outputs, refer to the Ford Police Interceptor Modifier Manual.

For programming information, see the Convergence Configuration Software Manual. For a chart showing the default configurations for the control pad and for the steering wheel switches connected to the four low-input circuits, see page 44 for the SSP2000 and page 45 for the SSP3000.

Figure 3.16 Power and active-low input connections



Connecting Power to the Control Pad (Cable Assy. 17500063)

The red and black leads from the control pad supply power to the SSP3000 system when the vehicle ignition key is in the ignition (start) position (Figure 3.16).

To connect the control pad to ignition power:

1. Use a multimeter to determine which source provides power when the vehicle key is in the ignition position.

2. Connect the red lead from the control pad to the switched side of the vehicle ignition harness. **Do not splice the red lead to the power leads for accessories.** Extend the lead with 22 AWG leads or thicker.

3. Connect the black lead from the control pad to negative ground. Extend the lead with 22 AWG leads or thicker.

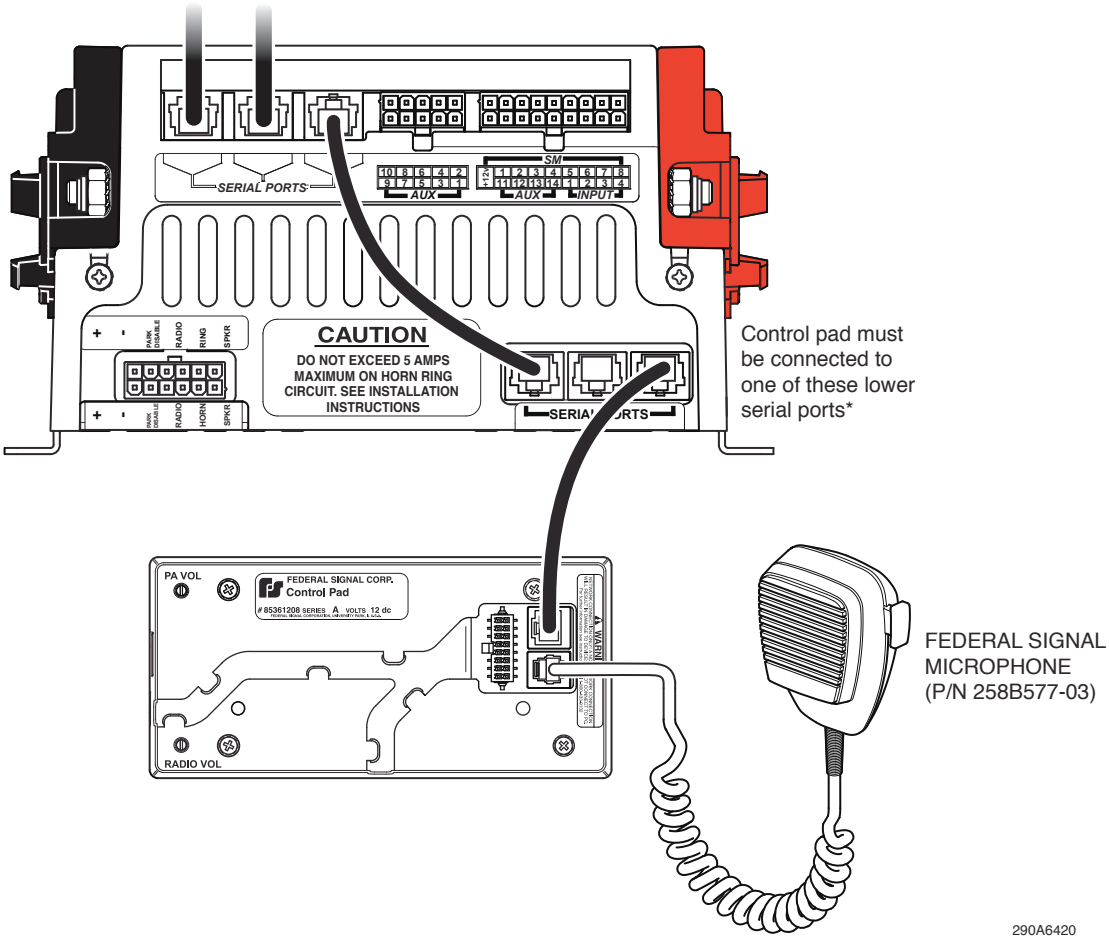
4. Insulate spliced leads with twist-on wire connectors. Fold and seal unused leads. Use wire ties and hold-downs for strain relief.

Connecting the Federal Signal Microphone (P/N 258B8577-03)

The microphone provides high quality voice reproduction in for public address over the siren speakers. The microphone push-to-talk switch overrides all siren functions, except radio rebroadcast, for instant PA use. The microphone connection is not required for the siren to operate properly.

To attach the microphone cable to the control pad, insert the modular telephone-type plug in the microphone jack until it locks. For instructions on adjusting the PA volume, see "Setting the Gain for Public Address (PA)" on page 36.

Figure 3.17 Power connections for the control pad



Connecting the Siren to the Battery

This section has instructions for making the final electrical connections from the siren to the battery. These connections supply power to the SSP3000 system. Required are an installer-supplied in-line fuse and wiring of an amperage capacity sufficient to handle the total vehicle electrical loads.

⚠ WARNING ***BATTERY EXPLOSION—To avoid a battery explosion, always disconnect the negative battery cable first and reconnect it last. Avoid causing a spark when connecting near or to the battery. The gases produced by a battery can cause a battery explosion that could result in vehicle damage and serious injury.***

⚠ CAUTION ***HIGH CURRENT ARCING—Do not connect this system to the vehicle battery until ALL other electrical connections are made and you have verified that no shorts exist. High current conductors can cause hazardous sparks or burning wire resulting in electrical fires.***

Preparing to Connect the Power Leads

Before connecting the amplifier/relay module to the battery, ensure that your final installation goes smoothly by taking these preparatory steps:

1. Visually check all connections and wiring to ensure that all connections are correct and secure.
2. Ensure that there are no loose strands or other bare wires that may cause a short circuit. Also, all wires must be protected from any sharp edges that could eventually cut through the insulation.
3. Verify that are other electrical connections are completed and that no shorts exit.
4. Use an ohmmeter to verify that a short circuit does not exist between the positive (+) and negative (–) battery cable leads. Also, there must be no short circuits between the positive wires and the vehicle chassis.

Connecting the Power Leads to the Vehicle Battery

The installer-supplied red (positive) and black (negative ground) power leads from the siren amplifier/relay module to the vehicle battery should be as short and direct as possible.

1. Route the red lead and black lead from the siren to the battery.
2. Crimp a ring terminal on the red lead and connect it to the positive (+12V) battery terminal.
3. Crimp a ring terminal on the black lead and connect it through an in-line fuse to the negative (–NEG) battery terminal. The fuse must be of an amperage capacity sufficient to handle the total vehicle electrical loads.
4. Reconnect the positive cable to the vehicle battery and tighten the clamp.
5. Reconnect the negative cable to the vehicle battery and tighten the clamp.

CHAPTER 4

Setting the Gain for Radio Rebroadcast and PA

The radio rebroadcast feature allows incoming two-way radio messages to be amplified by the siren amplifier/relay module and rebroadcast over the siren speakers of the SSP3000 system. The feature overrides all sirens functions. **Button 7** is programmed as the default control for radio rebroadcast. The gain control for radio rebroadcast is a recessed potentiometer on the front of the siren amplifier/relay module (Figure 4.2 on page 36). Wiring connections are described in "Radio Rebroadcast (Cable Assembly P/N 1751530)" on page 28.

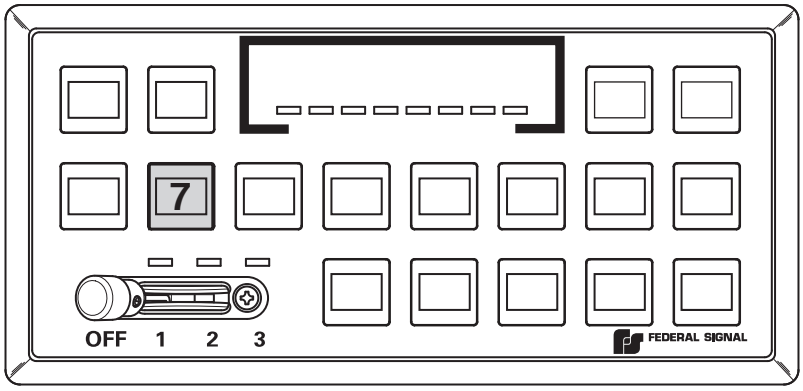
For public address, the Smart Siren Platinum System includes a microphone that connects to a serial port on the back of the control pad. When the operator presses the microphone push-to-talk button and speaks into the microphone, the operator's voice is amplified and broadcast over the siren speakers. The primary control for adjusting the PA gain is a recessed potentiometer on the front of the siren amplifier/relay module (Figure 4.3 on page 36). A secondary control for the PA gain is a recessed potentiometer on the back of the control pad (Figure 4.4 on page 37).

Setting the Gain for Radio Rebroadcast

To adjust the radio rebroadcast volume:

1. Stand outside the vehicle in an inclosed area and turn on the two-way radio.
2. Adjust the volume level of the radio to its normal operating volume.
3. Press **Button 7** on the control pad to turn on radio rebroadcast (Figure 4.1).

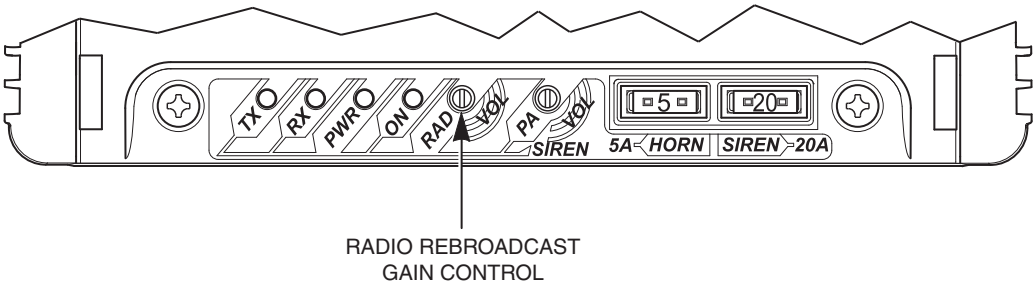
Figure 4.1 Default control pad button for radio rebroadcast



4. Stand outside of the vehicle and note the volume level of the radio rebroadcast. If the volume is too loud or too soft, insert a small flat-head screwdriver in the gain control port for radio rebroadcast (**RAD VOL**) on the front of the siren amplifier/relay module (Figure 4.2). Turn it counter-clockwise to increase the volume until audio feedback (squeal) occurs or clockwise to decrease the volume.

5. To adjust the gain of the radio rebroadcast further, insert a small screwdriver in the gain control port (**RAD VOL**) on the back of the control pad (Figure 4.4 on page 37). Turn it counter-clockwise to increase the gain to just below the point where audio feedback occurs.

Figure 4.2 Gain control for radio rebroadcast (siren amplifier/relay module)



6. To turn off radio rebroadcast, press **Button 7**.

Setting the Gain for Public Address (PA)

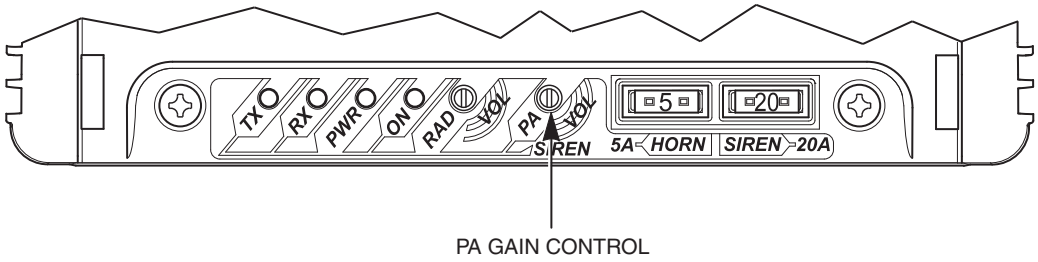
To adjust the PA gain:

1. Stand outside the vehicle in an enclosed area and press the push-to-talk button on the control pad microphone. Speak into the microphone in a normal tone of voice.

2. If the volume is too loud or too soft, insert a small screwdriver in the PA gain control port (**PA VOL**) on the front of the siren amplifier/relay module (Figure 4.3). Turn it counter-clockwise to increase the volume until audio feedback (squeal) occurs or clockwise to decrease the volume.

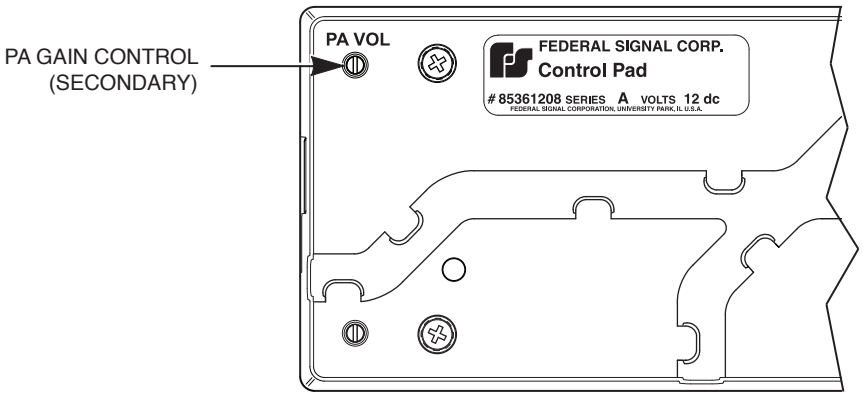
NOTE: Audio feedback depends upon the microphone gain, open windows, speaker placement, and the proximity of reflecting surfaces such as walls, buildings, or other vehicles.

Figure 4.3 Gain control for PA (siren amplifier/relay module)



3. To adjust the PA gain further, insert a small flat-head screwdriver in the PA gain control port (**PA VOL**) on the back of the control pad (Figure 4.4). Turn it counter-clockwise while speaking into the microphone to increase the gain to just below the point where audio feedback occurs.

Figure 4.4 Gain control for PA (control pad)



CHAPTER 5

Mounting the Siren and Control Pad

The next step in the installation after wiring and connecting the SSP3000 system is to permanently mount the siren amplifier/relay module and control pad in the vehicle. Verify that the mounting locations you selected earlier are safe for installing these components. Before proceeding, review the following precautions before mounting the equipment.

⚠ WARNING	***AIRBAG DEPLOYMENT—Do not install equipment or route wiring in the deployment path of an airbag. Failure to observe this warning will reduce the effectiveness of the airbag or potentially dislodge the equipment, causing serious injury or death.***
⚠ WARNING	***SEAT REMOVAL PRECAUTION—If a vehicle seat is temporarily removed, verify with the vehicle manufacturer if the seat needs to be recalibrated for proper airbag deployment.***
NOTICE	***UNIT REQUIRES AIR FLOW (SSP3000 ONLY)—The siren amplifier/relay module is cooled by an internal fan. Do not install it in areas where the air flow is restricted. Do not mount the unit near a heater duct or under the hood..***
NOTICE	***UNIT IS NOT WATERPROOF—The housing of the siren amplifier/relay module is NOT waterproof. The module must be mounted in a location that is sheltered from falling rain, snow, standing water, etc.***
NOTICE	***DRILLING PRECAUTIONS—When drilling holes, check the area you are drilling into to be sure you do not damage vehicle components while drilling. All drilled holes should be de-burred and all sharp edges should be smoothed. All wire routings going through drilled holes should be protected by a grommet or convolute/split loom tubing.***

Mounting the Siren Amplifier/Relay Module

Installer-supplied #10-32 mounting hardware is required to mount the siren amplifier/relay module.

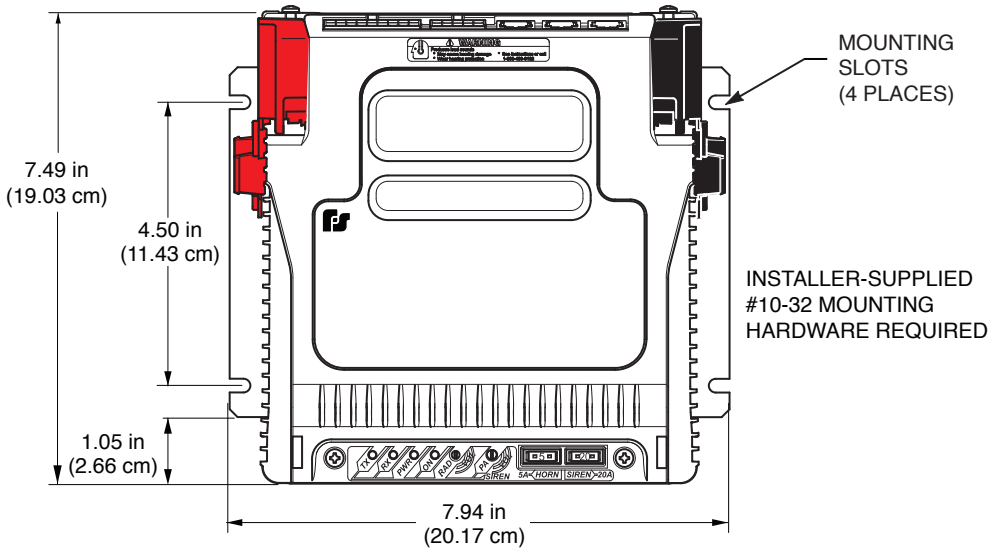
Tools needed:

- #18 tap drill for steel and iron
- Phillips screwdriver
- Pencil or felt-tip pen for marking drill locations

To mount the siren amplifier/relay module in the vehicle:

1. Use the base of the siren amplifier/relay module as a template (Figure 5.1) or the dimensions shown in Figure 5.1 to mark the centers of the four mounting holes.

Figure 5.1 Slots in base of siren amplifier/relay module for mounting hardware



2. Tap and drill the center of the four mounting holes.
3. Center the slots in the base of the siren amplifier/relay module over the drilled holes and secure it with the installer-supplied #10-32 mounting hardware.

Mounting the Control Pad

The control pad comes with two mounting brackets and mounting hardware.

Tools needed:

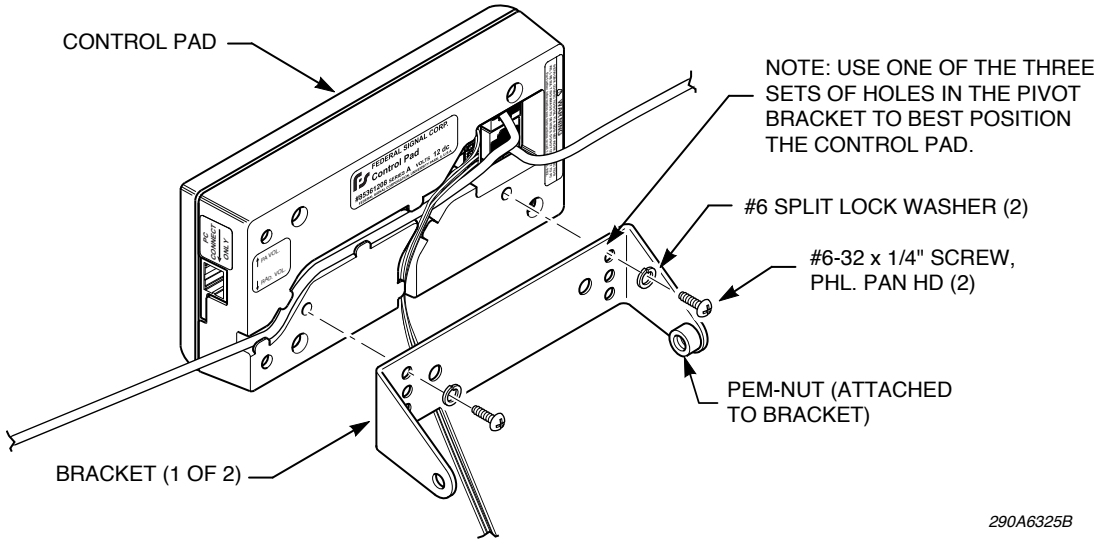
- Drill with #9 drill bit
- Phillips screwdriver
- 7/16" nut driver
- Pencil or felt-tip pen for marking drill position locations

To mount the control pad:

1. Secure a bracket to the control pad with the 6-32 x 1/4 Phillips screws and #6 lock washers (Figure 5.2 on page 40).
2. Using a 7/16" nut driver, secure the other bracket to the control pad/bracket assembly with the 1/4-20 x 3/4 hex head screws and 1/4" lock washers (Figure 5.3 on page 40).

3. Use the mounting bracket as a template and scribe two drill position marks at the selected mounting location.

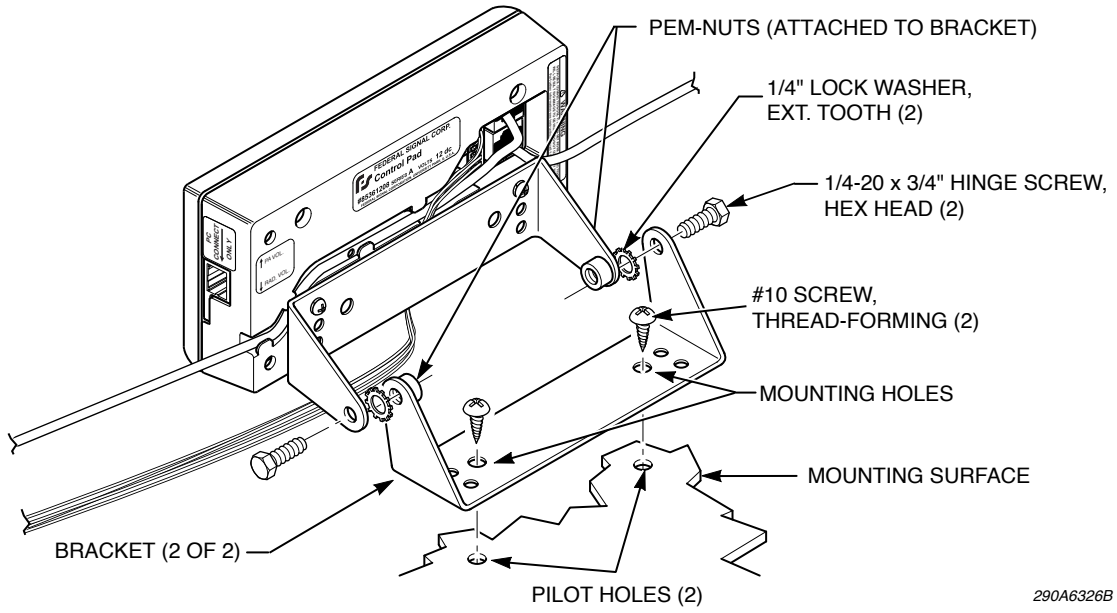
Figure 5.2 Bracket attached to back of control pad



4. Drill two pilot mounting holes at the drill position marks.

5. Secure the mounting bracket to the mounting surface with the #10 thread-forming screws (Figure 5.3).

Figure 5.3 Brackets attached to control pad and mounting surface



6. To adjust the angle of the control pad, loosen the hinge screws, tilt the control pad forward or backward, then securely tighten the screws.

CHAPTER 6

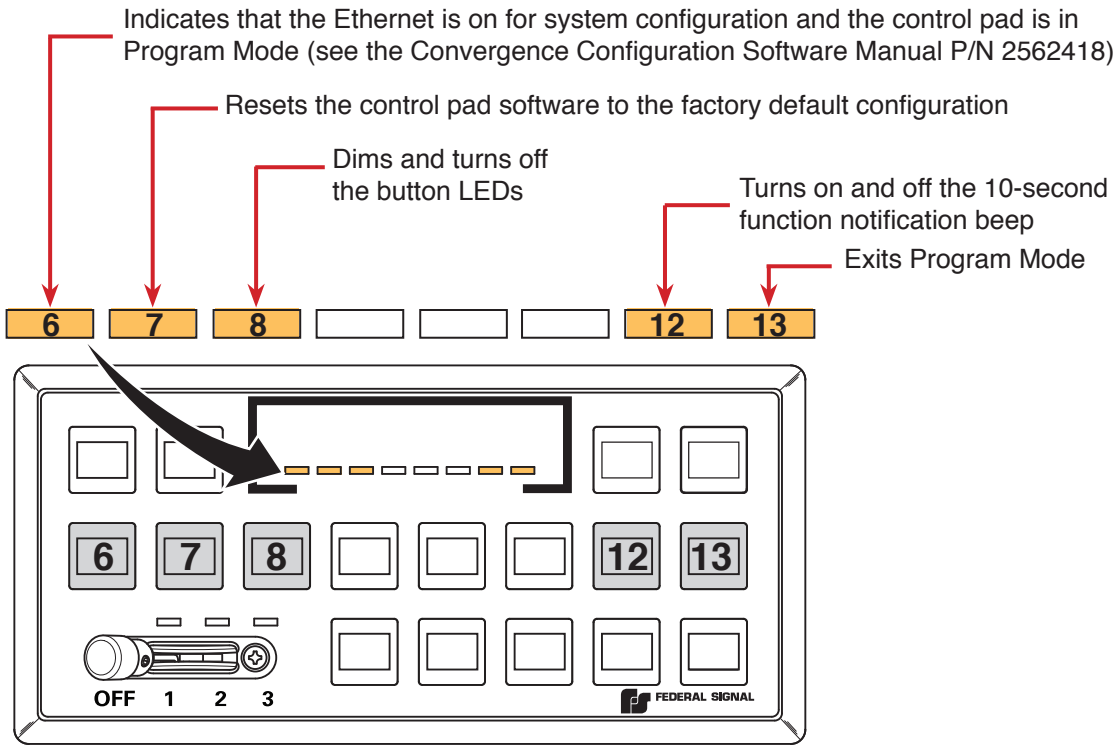
Setting Control Pad Options

The SSP3000 system control pad has these configurable features:

- A notification beep that sounds every ten seconds when one or more functions or devices in the SSP3000 system, such as a lightbar, is activated. The default setting is “on.”
- Step-through selection of one of four levels of LED dimming, including “off.” The default setting is at the brightest level.
- The operation and control of network devices, which are resettable to the factory-default configuration (see Figure 7.1 on page 44 or Figure 7.2 on page 45 and the Convergence Configuration Software Manual, doc. no. 2562418).

To help you confirm your selection, the button you press glows while the control pad beeps every 10 seconds. Additionally, one or more amber LEDs turn on in the row at the top of the control pad (Figure 6.1). These LEDs identify the button and its associated setting.

Figure 6.1 LEDs and buttons associated with Program Mode settings



Entering Program Mode

To set the keypad options, first enter Program Mode:

1. Press and hold Button 6 while powering up the control pad (Figure 6.1 on page 41).
2. During the long beep, release **Button 6**. The control pad beeps continuously.
3. Verify that the first amber LED is on.

Turning Off or On the 10-Second Notification Beep

To turn the beep off or on:

1. While in Program Mode, press **Button 12** (Figure 6.1 on page 41).
2. To continue, select another setting to change or press **Button 13** to exit Program Mode. Verify that the last amber LED turns on when you exit.

Dimming or Turning Off the Button LEDs

To dim or turn off the button LEDs:

1. While in Program Mode, press **Button 8** up to four times to step though decreasing levels of brightness (Figure 6.1 on page 41). To turn off the LEDs, press **Button 8** a fifth time.
2. To continue, select another setting or press **Button 13** to exit Program Mode. Verify that the last amber LED turns on on when you exit.

Resetting to the Factory Default Configuration

To reset the operation and control of network devices to the factory default:

1. While in Program Mode, press **Button 7** (Figure 6.1 on page 41).
2. To continue, select another setting to change or press **Button 13** to exit Program Mode. Verify that the last amber LED turns on when you exit.

Exiting Program Mode

To exit Program Mode

1. Press **Button 13** (Figure 6.1 on page 41).
2. Verify that the last amber LED turns on when you exit.

CHAPTER 7

Testing the Convergence Network Installation

⚠ WARNING ***SOUND HAZARD—All effective sirens and horns produce loud sounds (120 dB) that may cause permanent hearing loss. Always minimize your exposure to siren sound and wear hearing protection. Do not sound the siren indoors or in enclosed areas where you and others will be exposed to the sound.***

⚠ WARNING ***LIGHT HAZARD—To be an effective warning device, an emergency warning system produces bright light that can be hazardous to your eyesight when viewed at a close range. Do not stare directly into this lighting product at a close range or permanent damage to your eyesight may occur.***

The control pad is programmed with a default configuration that you can use to quickly check your initial installation of the SSP3000 system before you configure the control pad. For illustrations showing the default configurations for the control pad and for the steering wheel switches (if connected to the four control pad input circuits), see page 44 for the SSP2000 and page 45 for the SSP3000. When you test the system, be sure to note the status of the LED indicators in the externally mounted fuses of the siren amplifier/relay module. Also note the activity of the LEDs just below the surface of the module. The illustrations on the following pages describe what each LED indicates. Also verify that the 10-second function notification beep and lightning options of the control pad work as expected.

In addition, test all vehicle functions, including horn operation, vehicle safety functions, and vehicle lighting systems for proper operation. Ensure that the installation has not affected the vehicle operation or changed any vehicle safety functions or circuits. Do not test the sound and light system of the vehicle while driving. Operating the vehicle warning system may pose a hazard to the operator and other drivers if the system does not function as expected. Test the vehicle only in a controlled environment. After testing is complete, provide a copy of this manual to the instructional staff and all operating personnel.

Figure 7.1 SSP2000 default configuration for control pad

Signal Master Left, Right, Center Out Rear Lightbar	**Warn** Step-Through Warning Patterns 1 to 4 Rear Lightbar					**Button 14** Button Control: Push On/Off Lightbar: Dimming	**Button 15** Button Control: Push On/Off Rear Light Cutoff
Button 6 Button Control: Exclusive Siren: Standby	**Button 7** Button Control: Exclusive Siren: Radio	**Button 8** Button Control: Push On/Off Lightbar: Scene Light Active Hi/Low 10 A Relay 10 Relay Function: Steady On Active Hi Open Off	**Button 9** Button Control: Exclusive Siren: Wail	**Button 10** Button Control: Exclusive Siren: Yelp	**Button 11** Button Control: Exclusive Siren: Priority	**Button 12** Button Control: Momentary Siren: Manual	**Button 13** Button Control: Momentary Siren: Air Horn
Slide Switch 1 Button Control: Momentary Lightbar Pattern 10 Front Light Cutoff Relay: Active Hi/Low 10 A Relay 1 Relay Function: Steady On Active Hi Open Off	**Slide Switch 2** Button Control: Momentary Lightbar Pattern 17 Horn Ring Transfer Relay: Active Hi/Low 10 A Relays 1–3 Relay Function: Steady On Active Hi Open Off	**Slide Switch 3** Button Control: Progressive Flash Take-down/Alley Lightbar Pattern 26 Siren Dependent Enabled Horn Ring Transfer Active Hi/Low 10 A Relays 1–5 Relay Function: Steady On Active High, Open Off	**Button 1** Button Control: Push On/Off Lightbar: Left Alley	**Button 2** Button Control: Push On/Off Lightbar: Takedowns	**Button 3** Button Control: Push On/Off Lightbar: Right Alley	**Button 4** Button Control: Timer: 8 Second Lightbar: Intersection Pattern 22	**Button 5** Button Control: Security Timer: 8 Seconds Active Hi/Low 10 A Relay 6: Relay Function: Steady On Active High Open Off

Figure 7.2 Default configuration for steering wheel switches wired to control pad

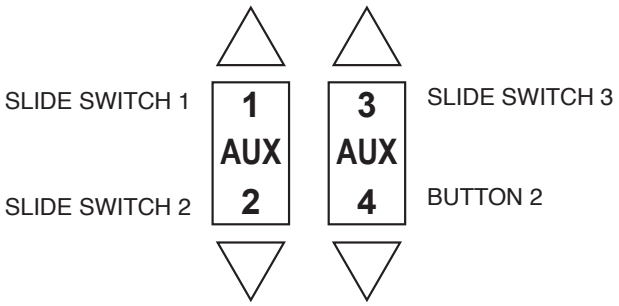


Figure 7.3 SSP3000 default configuration for control pad

Signal Master Left, Right, Center Out Rear Lightbar 8-Head Discrete	**Warn** Step-Through Warning Patterns 1 to 4 Rear Lightbar 8-Head Discrete					**Button 14** Button Control: Push On/Off Lightbar: Dimming	**Button 15** Button Control: Push On/Off Rear Light Cutoff
Button 6 Button Control: Exclusive Siren: Standby	**Button 7** Button Control: Exclusive Siren: Radio	**Button 8** Button Control: Push On/Off Active Hi/Low 10 A Relay 9 Relay Function: Steady On Active Hi Open Off	**Button 9** Button Control: Exclusive Siren: Wail	**Button 10** Button Control: Exclusive Siren: Yelp	**Button 11** Button Control: Exclusive Siren: Priority	**Button 12** Button Control: Momentary Siren: Manual	**Button 13** Button Control: Momentary Siren: Air Horn
Slide Switch 1 Button Control: Momentary Lightbar Pattern 10 Front Light Cutoff Relay: Active Hi/Low 10 A Relay 1 Relay Function: Steady On Active Hi Open Off	**Slide Switch 2** Button Control: Momentary Lightbar Pattern 17 Horn Ring Transfer Relay: Active Hi/Low 10 A Relays 1–3 Relay Function: Steady On Active Hi Open Off	**Slide Switch 3** Button Control: Progressive Flash Take-down/Alley Lightbar Pattern 26 Siren Dependent Enabled Horn Ring Transfer Active Hi/Low 10 A Relays 1–5 Relay Function: Steady On Active High, Open Off	**Button 1** Button Control: Push On/Off Lightbar: Left Alley Active Hi/Low 10 A Relay 6 Relay Function: Steady On Active High, Open Off	**Button 2** Button Control: Push On/Off Lightbar: Takedowns Active Hi/Low 10 A Relay 7 Relay Function: Steady On Active High Open Off	**Button 3** Button Control: Push On/Off Lightbar: Right Alley Active Hi/Low 10 A Relay 8 Steady On Active High Open Off	**Button 4** Button Control: Timer: 8 Second Lightbar: Intersection Pattern 22	**Button 5** Button Control: Security Timer: 8 Seconds Active Hi/Low 10 A Relay 10: Relay Function: Steady On Active High Open Off

Figure 7.4 Default configuration for steering wheel switches wired to control pad

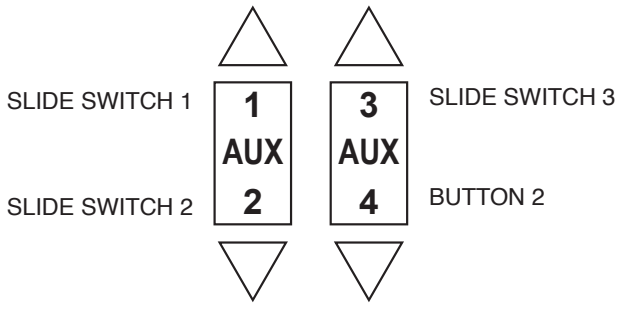


Figure 7.5 LED indicators on upper label of siren amplifier/relay module

AUX 11–14: LED flashes when the output is on for a 3A auxiliary solid-state relay. These relays are active-high only.

SM 20A: 20A fuse for the SignalMaster. (SSP3000 only)

3A AUX 11–14: 3A fuses for 3A auxiliary solid-state relays. Relays are 12 Vdc out only.

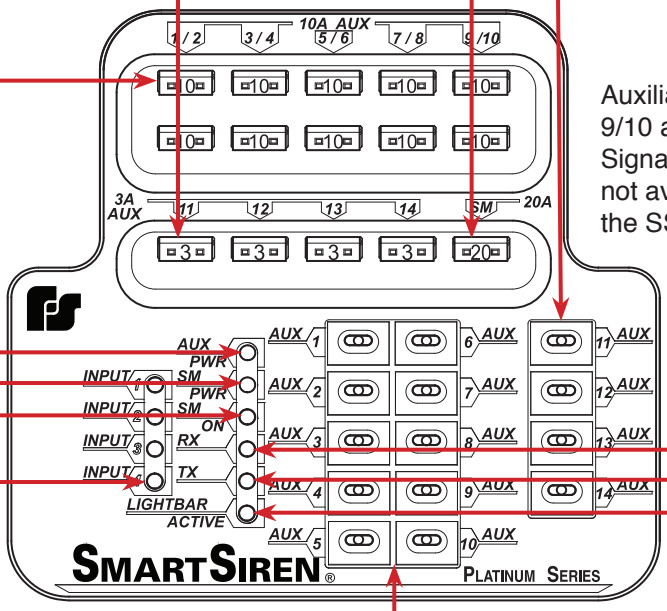
10A AUX 1–10: 10A fuses for 10A auxiliary solid-state relays. Some relays can be configured as 12 Vdc out or ground out.

AUX PWR: LED glows in the SSP3000 when battery power and serial cable power are present.

SM PWR: LED glows in the SSP3000 when the SignalMaster has power.

SM ON: LED glows in the SSP3000 when the SignalMaster flashes a pattern.

INPUT 1–4: LEDs glow in the SSP3000 when an input is receiving a signal. Voltage and amperage are required for the signal.



Auxiliary relays 9/10 and the SignalMaster are not available in the SSP3000.

In the SSP3000 each external mini ATM fuse has an integrated LED that glows when the fuse is blown. The table identifies the color code and amperage.

Color	Amp.
Violet	3
Tan	5
Red	10
Yellow	20
Gray	2

AUX 1–10: LED flashes in the SSP3000 when the output is on for an 10 A auxiliary solid-state relay. Relays can be configured as 12 Vdc out or ground out.

LIGHTBAR ACTIVE: LED glows in the SSP3000 when the lightbar is flashing.

TX (Transmit): LED flashes in the SSP3000 when the relay module transmits a message on the FS Convergence network.

RX (Receive): LED flashes in the SSP3000 when the relay module receives a message on the FS Convergence network.

Figure 7.6 LED indicators on lower label of siren amplifier/relay module

TX (Transmit): LED flashes when the siren amplifier transmits a message on the FS Convergence network.

RX (Receive): LED flashes when the siren amplifier receives a message on the FS Convergence network.

PWR: LED glows when the siren amplifier has power.

ON: LED glows when the network has power.

RAD VOL: Screw for adjusting the factory-set radio volume. First adjust the volume here, then adjust the volume on the back of the control pad, if needed.

PA VOL: Screw for adjusting the factory-set public address volume. First adjust the volume here, then adjust the volume on the back of the control pad, if needed.

5A HORN: 5A fuse for horn-ring circuit.

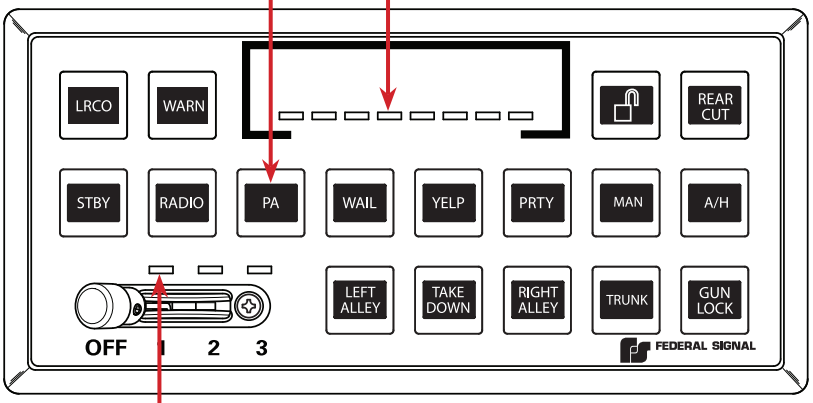
SIREN 20A: 20A fuse for the siren.

Figure 7.7 LED programming indicators on the control pad

The control pad legends in the illustration are for a typical configuration. The SSP3000 kit includes additional legends. All buttons are programmable. For instructions for programming the control pad, see the “SSP3000 Control Pad Configuration Software Manual” (doc. no. 2562418).

Button LEDs: All buttons on the control pad glow when the system is on. Pressed buttons blink to indicate that the function they control is active.

SMARTSIREN® LEDs: LEDs mimic these active SignalMaster patterns: Left, Right, Center-Out, or Warn patterns 1 to 4. They also indicate when a programmed feature of the key pad is active (see “Setting Control Pad Options” on page 41.)



SLIDE SWITCH LEDs: LEDs above the slide switch glow when the system is on (**1**=green, **2**=amber, **3**=red). The LED brightens above the position in which the slide switch is placed.

CHAPTER 8

Control Pad Legends and Safety Messages

To complete the installation, the SmartSiren kit includes:

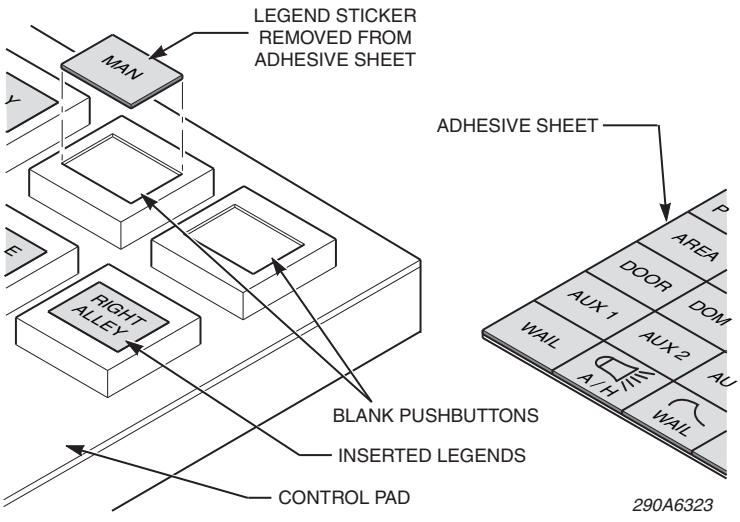
- A scored sheet of replaceable keypad legends that identify the functions of the control pad buttons (part no. 181460). Before installing the legends, configure the operation of the control pad with the Convergence Configuration Software (see the Convergence Network Software Configuration Manual, part no. 2562418).
- A scored sheet of two labels with precautions to guard against hearing loss when operating the siren amplifier/relay module (part no. 1612339).
- A safety message card for operators of Federal Signal Sound and Light System (part no. 256B691).

Applying the Replaceable Control Pad Legends

To apply the legends:

1. Peel the appropriate legends from the sheet and apply them to the control pad in the areas shown in Figure 8.1.
2. Verify that the label is properly tucked under the retaining ridge on the button.

Figure 8.1 Installing the control pad labels



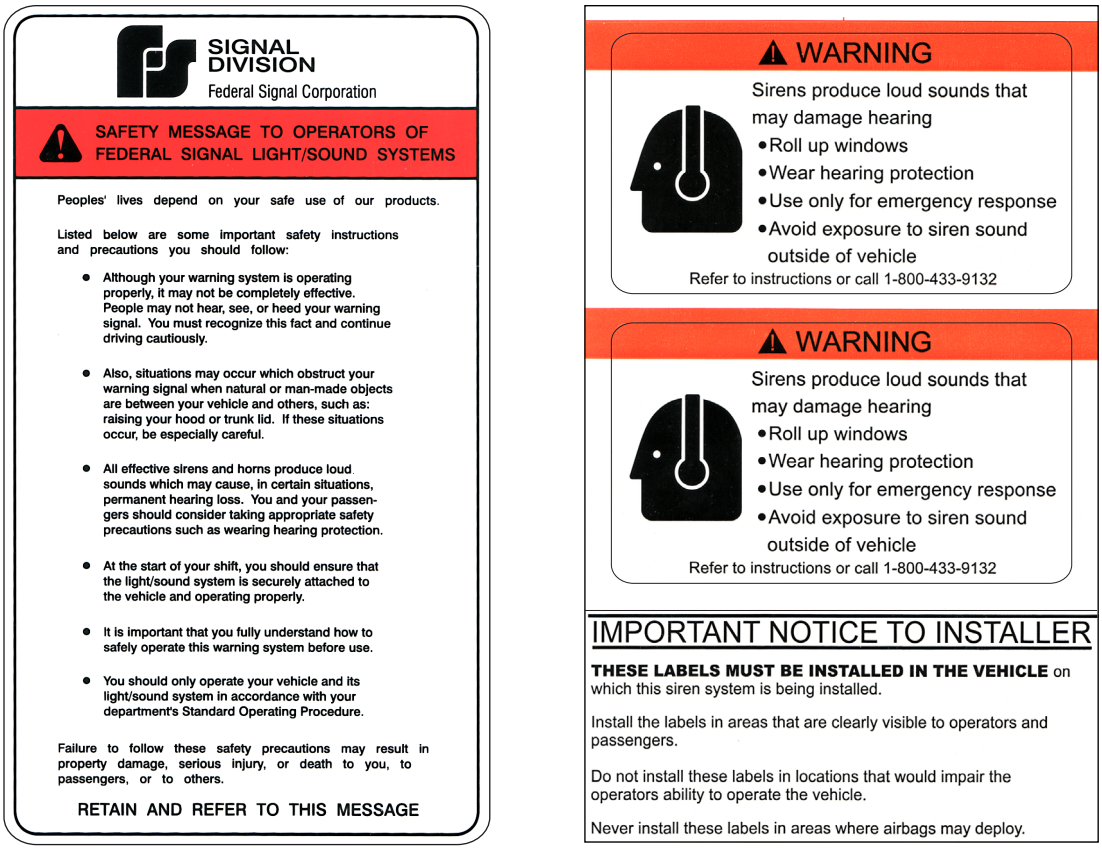
Distributing the Safety Message Card

Give the operator of the system the card entitled "Safety Message to Operators of Federal Signal Light/ Sound Systems" (part no. 256B691) (Figure 8.2). The operator must read and understand the safety instructions and keep the card in the vehicle for reference.

Applying the Siren Safety Labels in the Vehicle

The kit includes a sheet of two labels with siren safety messages (part no. 1612339) (Figure 8.2). These labels must be installed in the vehicle in which the system is installed. Install these labels in areas that are clearly visible to operators and passengers. Do not install the labels in locations that would impair the operators' abilities to operate the vehicle. Never install the labels in areas where airbags may deploy.

Figure 8.2 Safety message card (left) and siren safety labels (right)



CHAPTER 9

Safety Messages to Personnel Servicing Federal Signal Electronic Sirens

NOTICE

The people's lives depend on your proper servicing of Federal Signal products. It is important to read and follow all instructions shipped with the products. |In addition, listed below are some other safety instructions and precautions you should follow:

- Read and understand all instructions in this manual before servicing the electronic siren or control pad.
- To properly service an electronic siren or control pad, you must have a good understanding of automotive electrical procedures and systems, along with proficiency in the installation and service of safety warning equipment. Always refer to the vehicle service manuals when performing service on a vehicle.
- Electronic repairs must be performed by a qualified and competent electronics technician.
- Your hearing and the hearing of others, in or close to your emergency vehicle, could be damaged by loud sounds. This can occur from short exposures to very loud sounds or from longer exposures to moderately loud sounds. For hearing conservation guidance, refer to federal, state, or local recommendations. OSHA Standard 1910.95 offers guidance on "Permissible Noise Exposure."
- All effective sirens and horns produce loud sounds (120 dB) that may cause permanent hearing loss. Always minimize your exposure to siren sound and wear hearing protection. Do not sound the siren indoors or in enclosed areas where you and others will be exposed to the sound.
- Do NOT connect this system to the positive terminal of the battery until servicing is complete and you have verified that there are no short circuits to ground.
- For the electronic siren to function properly, the ground connection must be made to the NEGATIVE battery terminal.
- After repair, test the electronic siren and speaker system to ensure that it is operating properly.
- Federal Signal siren amplifiers and speakers are designed to work together as a system. Combining a siren and speaker from different manufacturers may reduce the warning effectiveness of the siren system and may damage the components. You should verify or test your combination to make sure the system works together properly and meets both federal, state and local standards or guidelines.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

CHAPTER 10

Servicing the Convergence Network System

Federal Signal recommends that the siren amplifier/relay module and control pad be returned to your local distributor or Federal Signal for service. External components such as cabling, fuses, and the red and black insulators are available as replacement parts (see Table 10.1 on page 58). With the exception of the slide switch in the control pad, there are no other user-serviceable parts within the control pad or the siren amplifier/relay module. After servicing the system, test it to ensure that it is operating properly. For more information, see “Testing the Convergence Network Installation” on page 43.

Replacing the Slide Switch

The slide switch can be removed from the control pad for replacement or service without disassambling the entire control pad. The slide switch is secured to the front of the control pad by a bezel and two 1/4"-20 x 3/4" screws. The switch is connected to the four-pin J3 connector on the back of control pad assembly, which lies below the logic control and power control PCBs and is easily accessible.

NOTICE ***STATIC SENSITIVE DEVICE—The circuitry of the control pad can be damaged by electrostatic discharge. Follow anti-static procedures removing the slide switch.***

Tools needed:

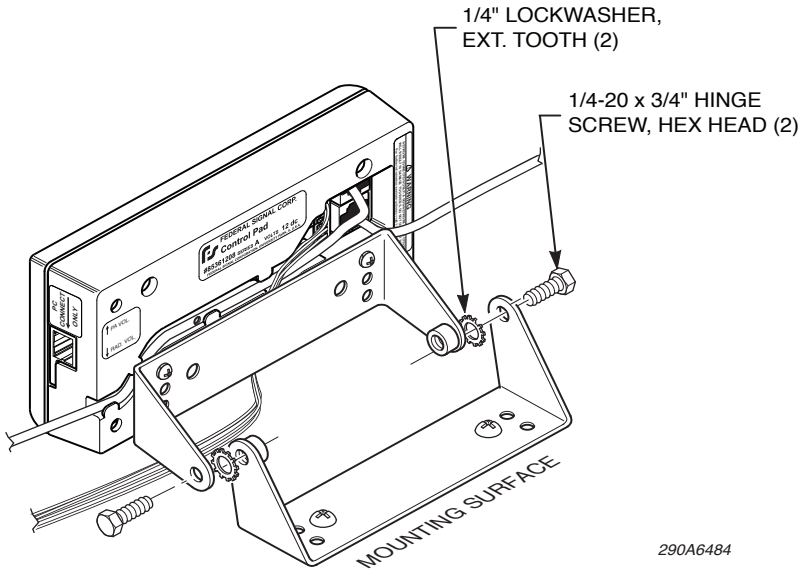
- 7/16" nut driver
- Small Phillips screwdriver
- Small needle-nose pliers
- 1/64" hex key wrench

Dismounting and Disconnecting the Control Pad

To remove the control pad:

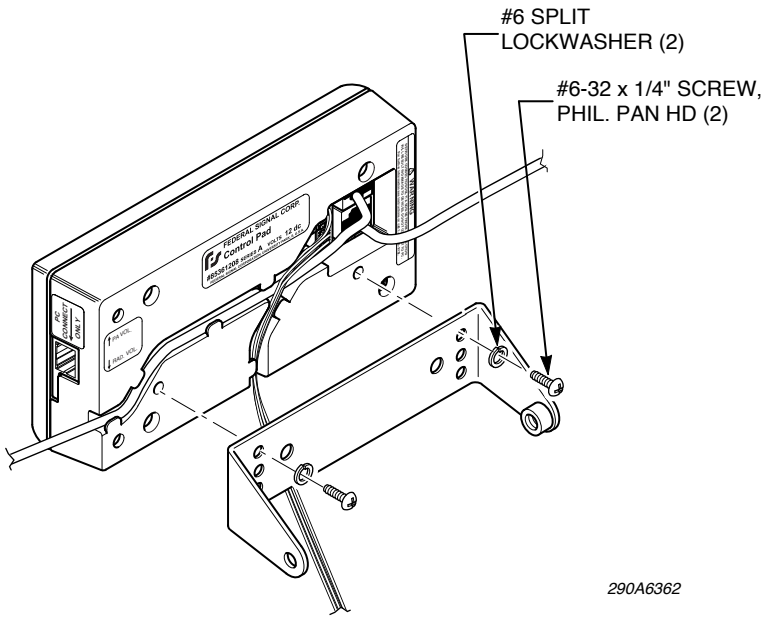
1. Use a 7/16" nut driver to remove the two 1/4-20 x 3/4" hinge screws securing the two mounting brackets together. Retain the screws and the two 1/4" external-tooth lock washers (Figure 10.1 on page 53).
2. Remove the two #6-32 x 1/4 Phillips screws securing the bracket to the rear of the control pad (Figure 10.2 on page 53). Retain the screws and the two #6 lock washers.

Figure 10.1 Control pad removed from mounting surface



3. Disconnect the cables and leads from the back of the control pad.

Figure 10.2 Control pad removed from mounting brackets

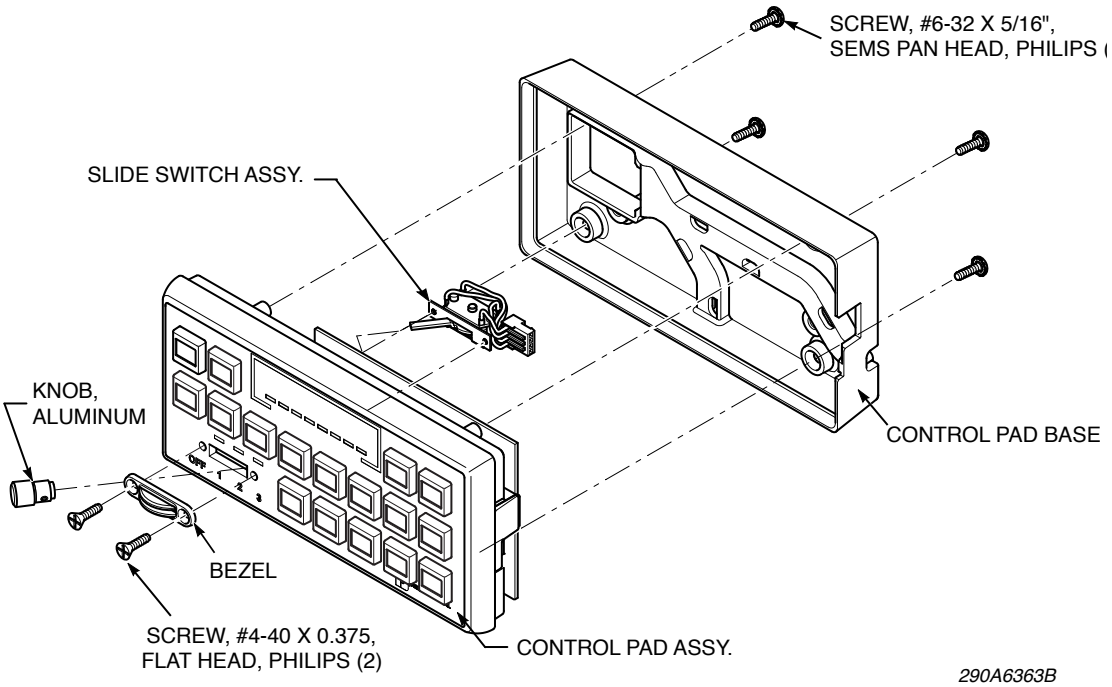


Replacing the Slide Switch in the Control Pad

To replace the slide switch:

1. Remove and retain the four Phillips #6-32 x 5/16" screws securing the control pad base to the control pad assembly (Figure 10.3).
2. Remove and retain base of the control pad.
3. Note the orientation of the wires of the slide switch connector. Unplug it from the four-pin J3 connector on the control pad assembly.
4. Note the orientation of the slide switch knob. Use a 1/64" hex key wrench to loosen and remove the set screw securing the knob to the shaft. Retain the set screw and knob.
5. Loosen and remove the two #4-40 x 5/16" Phillips head screws securing the slide switch bezel to the control pad assembly. Retain the screws.
6. Place the new switch assembly in position with the knob in the same orientation as the old switch.
7. Secure the bezel to the control pad assembly with the two #4-40 x 5/16" Phillips head screws.
8. Plug the slide switch connector into the four-pin J3 connector on the control pad assembly. Ensure that the wires on the connector face the edge of the board.
9. Secure the control pad base to the control pad assembly with the four #6-32 x 5/16" Phillips screws.

Figure 10.3 Slide switch removed from control pad



Reinstalling the Control Pad

To reinstall the control pad in the vehicle:

1. Reconnect the cables and wiring to the control pad.
2. Secure the rear mounting bracket to the control pad base with the two Phillips #6-32 x 1/4 screws (Figure 10.2 on page 53).
3. Secure the rear mounting bracket to the mounting surface bracket with the two 1/4" external-tooth lock washers and 1/4"-20 x 3/4" hinge screws (Figure 10.1 on page 53.)

Servicing the Siren Amplifier/Relay Module

Servicing the siren amplifier includes replacing damaged cables or external wiring, external fuses and the red and the plastic terminal insulators. The siren amplifier/relay module has 17 externally mounted mini-blade fuses for the siren, horn-ring circuit, SignalMaster, and auxiliary relays have LEDs that glow when the fuse fails. For detail on the components the fuses protect, see Figure 7.1 on page 44 and Figure 7.2 on page 44. Replacements fuses are obtainable at auto parts stores, from your local distributor. For information on ordering replacement parts from Federal Signal, see page 58.

Tools needed:

- 7/16" nut driver
- Small needle-nose pliers
- Flat-head screwdriver

Uninstalling the Siren Amplifier/Relay Module

To uninstall the siren amplifier/relay module from the vehicle:

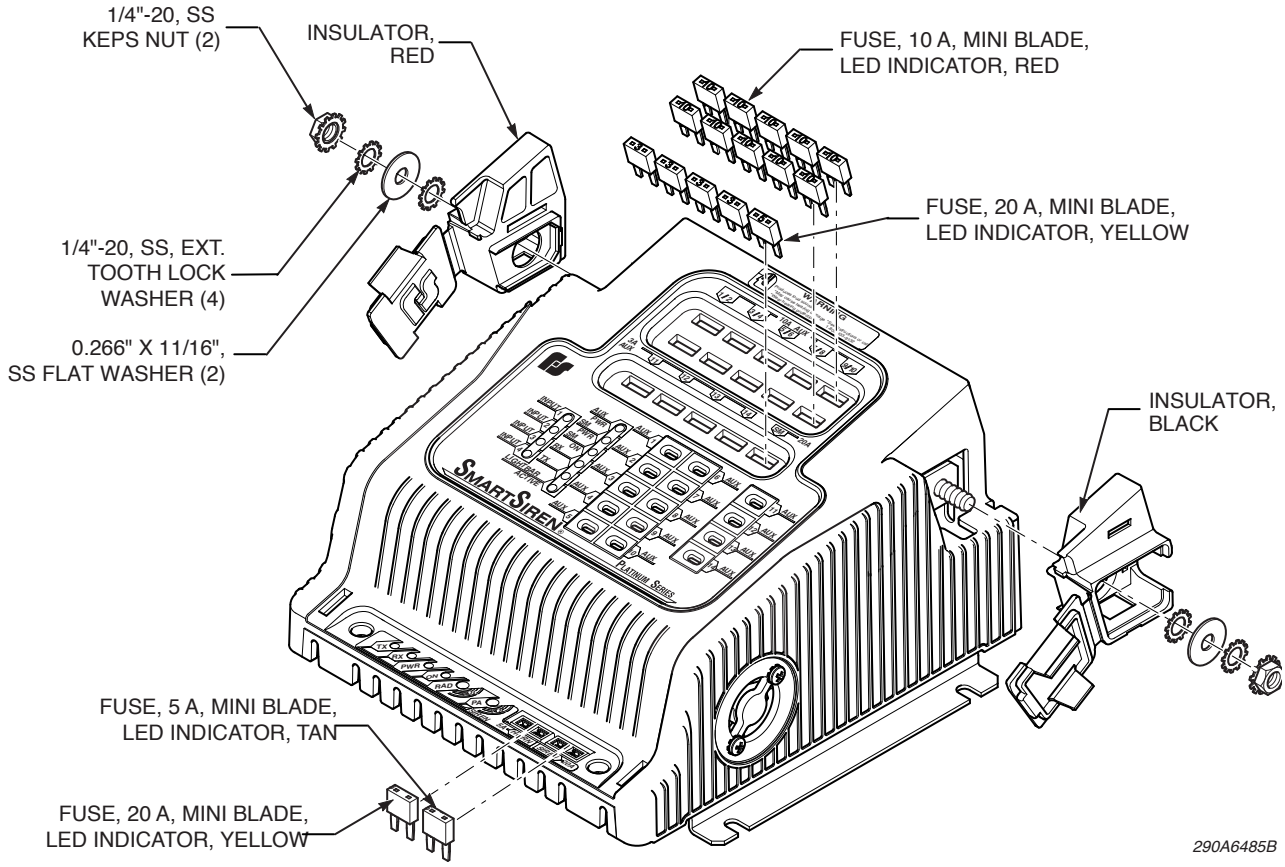
1. Remove and retain the installer-supplied #10 hardware.
2. To access the power connections, use a large screwdriver to pry open the covers on the red and black insulators.
3. Use a 7/16" nut driver to remove the 1/4"-20 Keps nuts securing the power cables to the terminals. Retain the two Keps nuts, the four external-tooth lock washers, and two flat washers.
4. Disconnect the Convergence network cable, serial cables and wiring from the rear of the siren amplifier/relay module.

Replacing an External Fuse

To replace a fuse:

1. Investigate and correct the cause of the fuse failure.
2. Remove a fuse by pulling it out with a pair of needle-nose pliers. Be careful not to bend the blades.
3. Insert the blades of the new fuse of the same type and amperage into the appropriate fuse holder beneath the surface of the housing. Make sure that it is properly seated.

Figure 10.4 External parts assembly (SSP3000 shown)

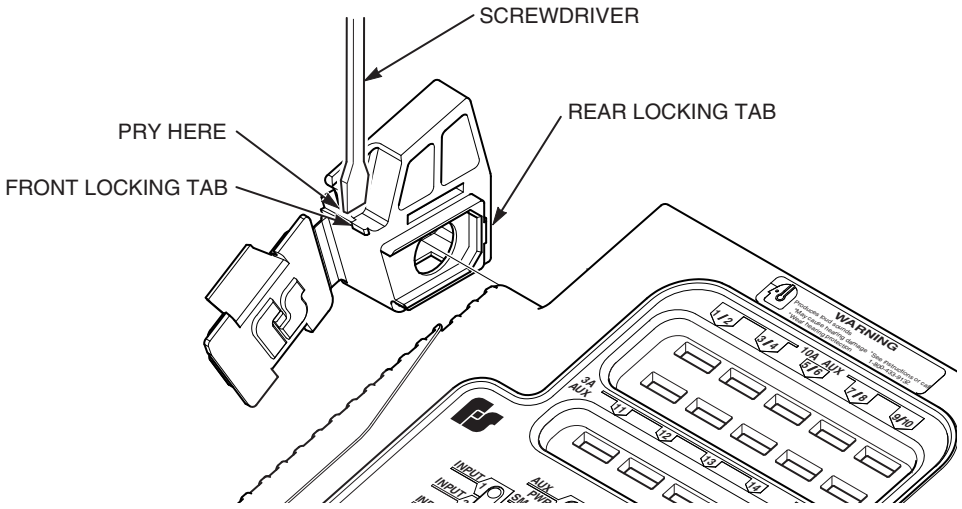


Replacing a Terminal Insulator

To replace an insulator:

1. Ensure that Keps nuts, the two lock washers, and the two flat washers are removed from the terminal (Figure 10.4 on page 56).
2. Note the locations of the locking tabs in Figure 10.5. Insert a flat-head screwdriver between the housing and the insulator near the front locking tab and pry off the insulator.

Figure 10.5 Locking tabs on red insulator



3. Place the new insulator on the terminal and insert the rear locking tab into the housing.
4. Push the front of the insulator against the housing to lock the front tab.

Reinstalling the Siren Amplifier/Relay Module

To reinstall the siren amplifier/relay module in the vehicle (Figure 10.4 on page 56):

1. On the power terminals reinstall a flat washer followed by an external-tooth lock washer.
2. Reconnect the power leads to the terminals and secure them with an external-tooth lock washer and a Keps nut.
3. Reconnect the Convergence Network cable, serial cables, and wiring.
4. Reinstall the siren amplifier/relay module in the vehicle with the installer-supplied #10-32 mounting hardware.

Getting Technical Support and Service

Federal Signal Corporation will service your equipment or provide technical assistance with any problems that cannot be handled locally. Any product returned to Federal Signal for service, inspection, or repair must be accompanied by a Return Material Authorization number. The RMA number can be obtained from your local distributor or Federal Signal. Please provide a brief explanation of the service requested or the nature of the malfunction. Contact your local dealer/distributor for replacement parts availability or contact the Federal Signal Service Department (7 a.m. to 5 p.m., Monday through Friday, Central Time) at:

Service Department
Federal Signal Corporation
2645 Federal Signal Drive
University Park, IL 60484-3167
800-433-9132
800-343-9706 (fax)
www.fedsig.com

Ordering Replacement Parts

To order replacement parts, please contact:

Customer Support
Federal Signal Corporation
Phone: 1-800-264-3578

Table 10.1 Replacement parts

Description	Part Number
Cable Assy., RS485, 25'	1751357-02
Cable Assy., RS485, 8"	1751357-06
Cable Assy., Control	1751530
Cable Assy., RJ45, Ethernet Crossover	1751532
Cable Assy., Auxiliary Relay	1751541
SSP3000 Cable Assy., SignalMaster and Inputs	1751542
SSP2000 Cable Assy.	1751542-NY
Cable Assy., Control Pad	17500063
Cover, SSP3000*	85361196
Keypad Legends, Scored Sheet	181460
Fuse, 3A, Mini Blade, LED Indicator	148210-02
Fuse, 5A, Mini Blade, LED Indicator	148210-04
Fuse, 10A, Mini Blade, LED Indicator	148210-06
Fuse, 20A, Mini Blade, LED Indicator	148210-08
Slide Switch Assy., Control Pad	122290-01
Bezel, Slide Switch	8573060
Knob, Aluminum, Slide Switch	85361185
Screw, #4-40 x 0.375, Flat Hd., Phil., Slide Switch Bezel	7000259-06

Continued on next page

Table 10.1 Replacement parts *(continued)*

Description	Part Number
Fuse, 2 A, Non-LED	148181-09
Fuse, 10 A, Non-LED	148181-09
Fuse, 20 A, Non-LED	148181-09

**Cover is available as a service part only*

Returning a Product to Federal Signal

Before returning a product to Federal Signal, call 800-264-3578, 800-433-9132, or 800-824-0254 to obtain a Returned Merchandise Authorization number (RMA number). To expedite the process, please be prepared with the following information:

- Your Federal Signal customer or account number.
- The purchase order number under which the items were purchased.
- The shipping method.
- The model or part number of the product being returned.
- The quantity of products being returned.
- Drop ship information as needed.
- Any estimate required.

When you receive your RMA Number:

- Write the RMA number on the outside of the box of returned items.
- Reference the RMA number on your paperwork inside of the box.
- Write the RMA number down, so that you can easily check on status of the returned equipment.

Send all material with the issued RMA Number to:

Federal Signal Corporation
2645 Federal Signal Drive
University Park, IL 60484-3167
Attn: Service Department
RMA: #_____

2645 Federal Signal Drive, University Park, IL 60484-3167
Tel.: (800) 264-3578 • Fax: (800) 682-8022
www.fedsig.com